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Foreword

In combat, safety is essential to force preservation. Statistics show that—

- In World War II, one out of every five American soldiers killed died as a result of an accident.
- In Korea, more than half the Army personnel who were hospitalized were injured in accidents.
- In Vietnam, accidents killed 5,700 soldiers, disabled more than 106,000 others, and produced nearly 5 million nondisabling injuries.

These are more than just numbers. They're a measurement of a serious loss of combat assets at a time when we could least afford to lose them—in the heat of battle. We must strive to keep such losses from happening on any future battlefield. To do this, it is imperative that we integrate safety standards for combat into training by—

- Establishing and enforcing high standards of performance.
- Creating a command climate of "tough caring."
- Using risk management principles to make good decisions.
- Recognizing the effects of stress and fatigue on performance.

Let us not forget that accident prevention is an important weapon in our arsenal; using it will multiply our combat power by preserving our assets.

This pamphlet is a quick reference intended to help Reserve Component unit leaders prevent accidents during Annual Training, thereby saving lives and preserving combat assets.

C. A. HENNIES
Brigadier General, USA
Commanding General,
U.S. Army Safety Center

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Section I

Planning With Safety In Mind

Each Annual Training (A.T.) session represents a period of intense training. Leaders should expect that some skills will have declined since the last A.T., and soldiers need to be reminded of their actions and personal influence on accidents. Planning with safety in mind is a sure-fire prerequisite to successful training.

Command Climate

The best first step is to develop a command climate that permeates safety throughout the organization. Make it clear that standards are to be adhered to and that supervisors will enforce them. This philosophy has to clearly emanate from the top. The old adage says it best: "The command is a reflection of the commander's personality." If safety isn't important to the commander, it won't be important to the soldiers who follow.

Supervision

Statistics show that 80 percent of all accidents are caused by human error, and supervision is the key to preventing human error. Simply put, leaders can reduce human error by establishing sound standards and consistently enforcing them. Failure to enforce a standard serves to establish a new, lower standard that may one day result in an accident. If, for example, a leader sits in the passenger seat and allows a driver to operate a vehicle too fast for conditions, he has failed in his leadership responsibility. He might make that trip; however, he has set the stage for a future accident. Consistent enforcement demonstrates "tough caring," which is looking out for the welfare of soldiers.

Buddy System

Establish a buddy system and provide guidance on the issues buddies should help each other with. Examples include enforcement of water consumption, eating, personal hygiene, watching for fatigue, sickness, heat injury, cold injury, swimming, and drinking and driving. Don't forget that leaders also need a buddy, because leaders frequently try to tough-out injuries to remain in the action.

Plan by Managing Risk

An excellent tool for planners to use is the risk management process. Risk management is the *process* of making operations safer without compromising the mission. Accident experience shows that mission-stopper accidents occur when victims are ignorant of hazards and countermeasures or when *directed* countermeasures are ignored. The greatest effort should be in hazard identification and countermeasure enforcement. This section provides leaders guidance on integrating the risk management approach into unit operations.

Rules

Three rules guide the risk management process:

■ **Accept no unnecessary risks.** The leader who has the authority to accept a risk has the responsibility to protect his soldiers from unnecessary risks. An unnecessary risk is one that, if reduced or eliminated, still allows mission accomplishment.

■ **Make risk decisions at the proper level.** Make risk decisions at a level consistent with the commander's guidance. The leader responsible for the mission should make the risk decisions.

■ **Accept risks if benefits outweigh the costs.** Leaders must take necessary risks to accomplish the mission. Leaders must understand that risk-taking requires a decision-making process that balances mission benefits with costs.

Process

There are five steps to the risk management process.

■ **Identify risks.** During mission analysis, identify specific risks associated with all specified and implied tasks. Determine the hazards causing these risks. Consideration of METT-T factors help identify risks and is crucial to the second step of assessing risks.

■ **Assess risks.** Determine the magnitude of risks. This involves an estimate of loss cost and probability. The METT-T format provides an excellent guideline of factors to consider in this risk assessment. The *Enemy* equates to specific hazards identified. Consider the following aspects of other elements: *Mission* complexity and difficulty; *Terrain,* all aspects of the physical environment, including weather and visibility; *Troops,* supervision, experience, training, morale, endurance, and equipment; *Time* available for execution, planning, and preparation. Determine the likelihood and extent of accidental loss based on the above analysis.

■ **Make decisions and develop controls.** Make risk acceptance decisions by balancing risk benefits against risk assessments, and eliminate unnecessary risks. Reduce the

magnitude of mission-essential risks through the application of controls. Controls range from hazard awareness to development of detailed operational procedures. Be sure controls *do not* jeopardize mission accomplishment. Involve the chain of command if necessary risks or controls prevent assigned mission requirements.

■ **Implement controls.** Integrate specific controls into plans, orders, SOPs, training performance standards, and rehearsals. Knowledge of controls down to the individual soldier is essential.

■ **Supervise.** Enforce controls and standards. This is key. Evaluate mission progress and changes to METT-T, then begin appropriate corrective actions. After mission completion, evaluate risk decisions and controls for inclusion in lessons learned.

Integration techniques

Two techniques are critical to maintaining unit battle focus:

■ **Individual/leader risk management** (focuses on individual through company-level command thought processes to recognize hazards and take action to reduce risk). Use FM 22-100: Military Leadership problem solving, decision making, and planning process. Identify the problem (hazard), gather information, develop courses of action, analyze and compare actions, make a decision, make a plan, and implement the plan. Memory aids such as METT-T and checklists help promote consistency.

■ **Command echelons risk management.** This technique uses the FM 101-5: Staff Organization and Operations Manual military decision-making process. This process integrates safety and risk assessment into operational decisions normally associated with battalion and higher planning and operations. The commander directs the staff to identify necessary risks and risk controls as "considerations affecting the possible courses of action." Staff officers use memory aids such as METT-T to promote consistency. The final commander's estimate and concept addresses significant risk acceptance, eliminations, and controls. Implement these decisions directly into applicable areas of

OPLANS (ORDERS). Commanders must ensure dissemination and enforcement of risk decisions and controls down to soldier level.

Application of Risk Management

Start by identifying potential A.T. hazards. An excellent method is to assemble leaders for a brainstorming session. Following are suggestions to get you started:

- Driving/getting to the training site.
- Intensity to get everything done (shortcuts).
- Long hours (fatigue).
- Competition for time (eliminating instruction, safety briefings, etc., assumed to be unimportant).
- Alcohol consumption.
- Physical fitness (potential heat casualties, cold weather injuries, lifting injuries, etc.).
- Degradation of skills.
- Macho attitudes.
- Range operations.
- Maintenance operations.
- Sports/recreational activities.
- Swimming/water operations (be mindful of weak swimmers).
- Building conditions (fire hazards, etc.)

Assess risks

After identifying the risks, assess the probability of their causing an accident. Use a chronological sequence of events to logically assess all aspects. For example, if you are conducting movement to an A.T. site, start with departure and end with arrival. Consider issues such as:

- Road conditions.
- Length of trip.
- Weather.
- Condition of vehicles.
- Driver experience/training.
- Driver rest.
- Day versus night driving.

- Speed limits.
- Cargo.
- Congested areas.
- Fuel points.
- Supervision (someone to ride "shotgun" and supervise drivers).

Make decisions and develop controls

The above factors are certainly not all inclusive, but they do serve as example. Once you have assessed the risks, make decisions as to what risks you are willing to accept (benefit outweighs risk), unwilling to accept (risk outweighs benefit), or able to make more acceptable by establishing procedures to control the risk.

For example, a map reconnaissance reveals that the most direct route to your destination passes through a major city. You seek alternate routes only to discover the best avoidance route adds 2 hours to your driving time. Now, you must weigh the risk of additional driving time (fatigue, increased accident exposure) against the risk of driving through a congested area. If you decide to drive through the city, seek to control the risk by establishing special procedures (speed limits, separation, breakdown, etc.). Additionally, you may provide strip maps and/or reduce the number of vehicles in a serial to ease span of control.

Implement controls

Ensure that the controls you develop to reduce risks are established as standards and are made known to all affected. The controls may be written into movement plans, operations orders, unit SOPs, policy statements, and so forth.

Supervise

Risk management is only as effective as the leaders who are charged with enforcing standards. The means of integrating safety into operations, rather than treating safety as an "add-on," is to enforce standards, which then makes safety inherent in your operations.

Planning Checklist

Complete safe A.T. planning by using this checklist to ensure that you are prepared.

- Evaluate the risk associated with each activity, and take action to make risk decisions and implement controls to reduce risk.
- Coordinate with host installation for safety requirements and support while at Annual Training.
- Review unit SOPs to make sure safety is built in.
- Conduct safety briefings in advance. Emphasize driving, maintenance activities, and weapons handling. (Most installation safety offices can provide information peculiar to their area.)
- Ensure that safety officers/NCOs are appointed and know their responsibilities.
- Ensure that drivers and equipment operators are licensed to operate the vehicles and equipment they will use.
- Ensure that personal protective clothing and equipment is inventoried, serviceable, and available.
- Identify weak and nonswimmers; ensure that leaders know who they are.
- Ensure that accident reporting requirements are understood.
- Make sure that references are available (appendix A).

Section II

Movement to Annual Training Site

Preparation for and movement to the Annual Training site is characterized by hard work, long hours, and tedious tasks. All of this equates to high-risk activity. As such, leaders must be aware of actions they can take to control and reduce risk.

Driving

Vehicle accidents kill more soldiers than all other accidents *combined.* And the events leading up to A.T. increase the already high risk associated with driving, both on and off duty. Soldiers may drive long distances after putting in a hard-day's work, then perform more hard work before departing for the A.T. site.

The following will assist leaders in controlling and reducing driving risks:

■ Enforce AR 385-55 requirements for the use of safety belts and the wear and use of protective equipment for motorcycle riders.

■ Do not tolerate drivers who take risks ("hotdoggers").

■ Establish a policy on alcohol consumption and driving, such as no drinking 12 hours prior to driving or while on duty.

■ Prior to annual training—

❑ Coordinate with the host installation safety office and obtain a map of the area in which you will train. The safety office should be able to identify high-accident areas, which should be marked on the map and briefed to soldiers. Where possible, avoid these areas.

❑ Provide information on local and state traffic regulations. This is especially important if training is to be conducted overseas.

❑ Disseminate information on road and weather conditions. Recommend hazard areas to be avoided.

Driver Training and Selection

Driver error is the single greatest cause of Army vehicle accidents. Driver training is the key to reducing these accidents.

Training

■ The U.S. Army Transportation School has published TC 21-305: Techniques and Procedures for Wheeled Vehicle Drivers. It is a comprehensive guide to the selection and training of wheeled vehicle drivers. Additionally, the TC 21-305-series provides standardized training on specific vehicles (see appendix B).

■ Train drivers to standards.

■ Do not allow the pace of the operation to force use of poorly trained or inexperienced drivers at critical times.

Selection

■ Ensure drivers are qualified on the vehicle they are to drive.

■ Assign an assistant driver or senior occupant whenever possible.

■ Consider reviewing civilian traffic violation records to determine driver suitability.

Driving Techniques

New strategy

Driving safely in traffic requires the development of mental strategies to make sound judgments and take appropriate corrective actions. One such mental system is the SPA system—Search, Predict, Act.

■ **Search.** Actively look for potential hazards and identify the risk they may pose to the safe operation of your vehicle.

■ **Predict.** Prioritize the potential hazards based on their relative risk and predict the potential results.

■ **Act.** Choose and execute the best course of action to minimize the risk.

Two-second following distance

This is the minimum distance a driver should maintain between his vehicle and the one directly ahead. Because this distance allows only minimum reaction time to actions of the vehicle ahead, it should be increased at night or in adverse weather. The 2-second following distance is established by picking a fixed object along the roadside ahead. As the rear of the vehicle ahead passes the object, the driver of the following vehicle starts counting "one thousand one, one thousand two." If he reaches the object before reaching the 2-second count, he is too close; he should slow down and increase the interval.

Leaders should remind drivers of the following driving tips:

Driving in fog

■ Don't over-drive your visibility.

■ Drive with low beams.

■ If you stop because of poor visibility, get off of the road as far as possible.

■ Delay travel if practical.

Driving in rain

■ At the beginning of a rain, water mixes with road dirt and oil to form a slippery road surface.

■ Traction may be lost due to hydroplaning (loss of traction due to the tires rising on a wedge of water—just like water skiing).

■ Turn on headlights.

■ In congested areas, watch for pedestrians darting about to avoid rain.

Night driving

■ Turn on headlights early.

■ Increase following distances to increase reaction time.

■ Give turn and stop signals well in advance.

■ Avoid looking directly into the headlights of on-coming vehicles.

■ Ensure headlights are clean.

Predeparture Checks

Prior to departure, leaders should ensure that drivers—

■ Perform all preoperational checks in accordance with the vehicle dash-10.

■ Know they are required to use safety belts.

■ Know established speed limits and what to do in case of a breakdown or emergency.

■ Have a strip map/instructions on reaching destination.

■ Have required safety items in their vehicles (fire extinguisher, warning markers, first-aid kit, chock blocks, etc.).

Materiel Handling

In preparation for movement to Annual Training, soldiers will be lifting and loading equipment. It is essential that loading of equipment be supervised. Materiel handling accounts for 10 percent of all Army accidents, and the majority are the result of soldiers improperly lifting objects.

■ Be aware that the macho "I can lift" attitude often leads to injury.

■ Do not allow soldiers to lift more than they are capable of.

■ Require soldiers to help each other when lifting equipment.

■ Ensure that soldiers know the correct manual lifting methods.

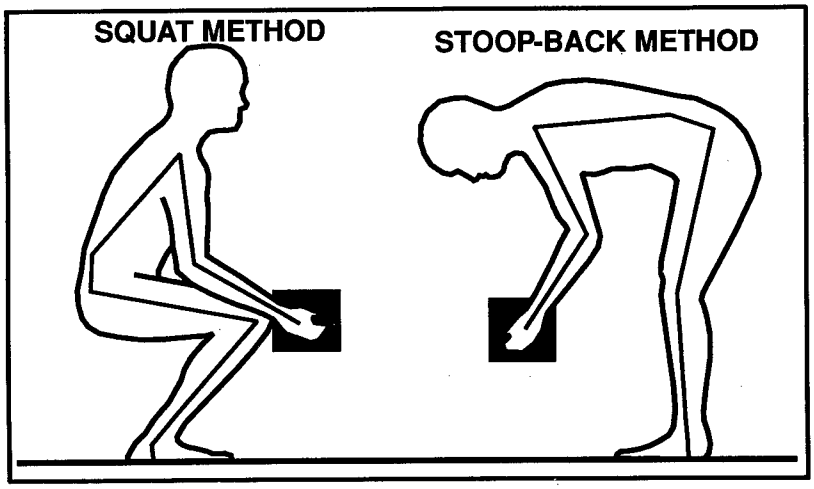
Manual lifting methods

■ **Squat method** (requires strong legs, hips, and lower back).

- Squat as close to object as possible.
- Keep back straight.
- Lift your body and the object, letting the legs and buttocks do the work.
- Always bring object as close to body as possible when lifting and carrying.

■ **Stoop-Back Method** (for those with weak lower body—injured knees or ankles or poor physical condition).

- Stand over object. Bend at hips and slightly at knees (NOT deep knee-bends).
- Lift object and bring it in close to body.
- Straighten back slowly as you raise object to waist level.



Correct carrying procedures

■ Warn personnel to NEVER twist or jerk body while lifting.

■ Make sure personnel always carry objects as close to waist height as possible.

■ Assure personnel never carry a load heavier than can be managed with ease.

■ Enforce the "when in doubt, get help" rule.

■ Caution personnel to avoid sudden movements and to move slowly and deliberately.

■ Caution personnel to make sure their path of travel is unobstructed and desired location is adequate for the size of object BEFORE lifting object.

■ Do not allow personnel to carry unbalanced loads.

■ Make sure personnel have assistance if their vision of the path of travel is blocked.

■ Ensure that personnel wear gloves.

Slips, trips, and falls

■ Ensure that personnel keep walkways and work areas clear of tripping hazards.

■ Caution personnel not to jump or step from cargo vehicles while carrying loads; tell them to use a ramp or to get help.

■ Remind personnel to use extreme care when carrying objects in loose sand or over rough terrain or surfaces.

Convoy Operations

Following are detailed checklists that commanders, convoy planners, and unit safety personnel can use to ensure that convoys to the Annual Training site are professionally and safely planned and executed.

Route selection

■ Has map reconnaissance been completed?

■ Has a physical reconnaissance been made of the entire route? (Don't assume that all is the same as last year; detours, new construction, washed-out bridges, and so forth are very real possibilities.)

■ Can all vehicles clear bridges, underpasses, tunnels, and meet other clearance and weight limits? If not, have alternate routes been selected?

■ Can all vehicles maintain minimum speed limits? If not, have alternate routes been selected?

■ Have urban or potentially congested areas been identified?

■ To avoid congestion, have alternate routes been selected?

■ Has convoy movement been planned to avoid peak traffic periods?

■ Have alternate routes been selected for vehicles transporting oxygen, acetylene, or other compressed gases?

■ Have traffic control points been established at hazardous locations?

■ Is adequate space available for vehicle organization and lineup at start point?

■ Is sufficient space available for maneuvering of vehicles, sequential lineup of vehicles, and march units and serials?

■ Has arrival time at release point been established/ sequenced?

Convoy organization

■ Are convoys of more than 20 vehicles separated into serials?

■ Are serials divided into march units if required?

■ Is convoy element size based on capacity of halt/bivouac areas?

■ Have the following personnel been designated and briefed?

- ❑ Commanders for each serial and march unit.
- ❑ Pace setter.
- ❑ Trail party.

■ Are vehicles transporting troops not the last vehicle in a serial or march unit?

■ Are only vehicles with fixed seating used to transport troops?

■ Are empty vehicles or those carrying general cargo used as buffers (i.e., last vehicle in convoy)?

■ Are recovery and medical vehicles near the rear of the convoy?

■ Are convoy and convoy element commanders positioned for best convoy control?

■ Has convoy operation during periods of darkness been avoided?

■ Have safe convoy and catch-up speeds been established

for expected road and environmental conditions?

- Are the following proper vehicle intervals planned?
  - Controlled access highway: 220 yards.
  - Rural conventional highway: 150 yards.
  - Urban conventional highway: 50 yards.
- Are lead, rear, and element commander vehicles marked for easy identification?
- Are flags and signs correctly mounted on each vehicle?
- Is each convoy identified by a convoy clearance number?
- Has radio equipment (ideally, 2-way radio in first and last vehicle of each serial and unit) been checked and assigned to vehicles?
- Have signal operating instructions been provided to vehicles with radios and the liaison team?
- Have personnel been briefed on visual and audio signals?

En route

- Have halt areas been identified along the route?
- Are all halts planned in designated rest areas or along terrain to permit vehicles to completely clear roadways?
- Have all halt areas been physically reconned to ensure sufficient capacity?
- Are halt areas shown on strip maps?
- Are serials scheduled to avoid overloading of halt areas?
- Do areas for meal/bivouac halts contain the following?
  - Sufficient areas for cooking and eating?
  - Waste disposal facilities?
  - Latrines?
  - Area for vehicle maintenance?
  - Security for cargo?
- Have road signs and messages been constructed and placed as required?

General precautions and procedures

- Are warning lights on first and last vehicle?
- Are vehicles carrying hazardous materials marked?
- Are accident procedures for the convoy established, to include—
  - Trail officer designated to supervise care of injured and

disposition of damaged vehicles?

❑ Notification of convoy commander, safety officer, and civilian police of accidents?

Rail Operations

In some cases, units may convoy to a railhead and then use train transportation to get to their final destination. Railhead operations require the application of risk management to identify potential problem areas and to develop appropriate countermeasures. The following information is provided to assist in that effort.

Safety personnel

An officer and NCO should be appointed whose only duties are safety. They should be identified by arm bands during the day and by chem lights at night.

Key personnel

■ Inspect vehicles (brakes, lights, turn signals, and fire extinguishers).

■ Ensure windows and windshields are covered with cardboard to prevent damage from rocks, etc.

■ Walk through railhead area and discuss potential safety problems (ice, snow, rain, electrical hazards).

■ Conduct safety briefing with all personnel involved.

■ Ensure that an ambulance is at all rail operations. (Drivers should know the route to the hospital, and medics should have a complete first aid kit.)

Ground guides

■ Ensure training is provided to all drivers in the proper use of ground guides and to all personnel in how to act as ground guides.

■ Have ground guides escort all vehicles on and off rail cars.

■ Ensure ground guides are used when backing and when in congested areas. Two ground guides are required when vision is restricted.

■ Remind drivers to keep ground guides in view at all times.

■ Instruct ground guides never to walk backwards, never to be on the same rail car as a moving vehicle, and never to put themselves between two vehicles.

■ Ensure ground guides wear road-guard vests while escorting vehicles on and off rail cars.

■ Ensure ground guides have two flashlights with extra batteries for use at night.

■ Caution soldiers that vehicles must not be mounted or dismounted while in motion.

■ Prohibit personnel from riding on vehicles during loading or unloading operations.

Load teams

■ Train personnel in rail loading/unloading procedures.

■ Provide instruction in proper use of tools, and inspect tools, blocking, lashing, spanners, and towbars for serviceability before use.

■ Provide gloves, helmets, and correct tools for the job and make sure they are used.

■ Inspect each tiedown assembly for breaks, cracks, gouges, open welds, or deformed components. Remove from use any that have defects.

■ Compare an eight-link segment next to the turnbuckle end of the chain with an eight-link segment near the hook fitting at the load attachment end of the chain assembly. If the eight links near the hook fitting are half an inch or longer than the eight links near the turnbuckle end, the chain has stretched beyond normal limits and should be replaced.

■ Inspect the connector link that attaches the chain/cable to the anchor fitting. If defects are found, replace the chain/cable and/or fittings.

■ If the chain/cable assembly and components are free of apparent damage, attach shackles or rings as required.

■ Pull chain/cable as tight as possible by hand before hooking the turnbuckle assembly (chain/cable must not be kinked or twisted).

■ Hand tighten turnbuckles, then continue to tighten them with an open-end wrench or a 15-inch crescent wrench.

■ After tiedowns have been tightened, lubricate exposed threads and jamnuts.

■ Secure the load attachment hook end of chain/cable assembly so it cannot swing free.

■ Secure unused chain/cable, shackles, and rings.

■ Chain binders and rail guards should wear safety shoes.

■ Require all tank turrets and howitzer tubes to be in travel lock and tied down. Turret rotation and gun-elevating controls must be wire tied to prevent movement.

■ Prohibit sleeping in, on, or around rail cars.

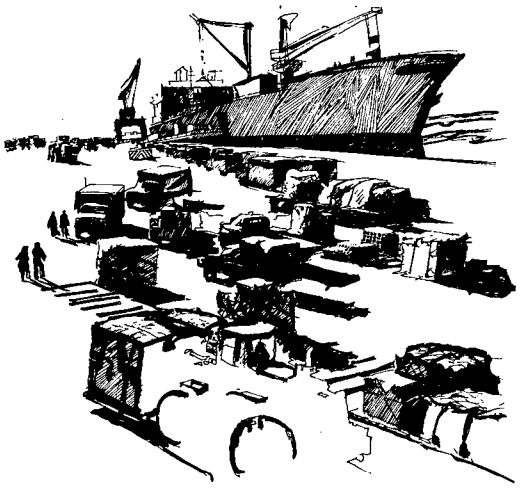
■ Prohibit unnecessary personnel from loitering at rail site.

■ Ensure all personnel maintain three points of contact when climbing on vehicles.

Power lines

■ Require antennas to be removed or tied down and internal equipment secured before moving to railhead.

■ Prohibit personnel from climbing on top of vehicles at railhead.



Port Operations

Port operations are inherently dangerous because most units are inexperienced and rarely conduct training for such

operations. The following information is a good start to ward off potential problems. A pamphlet on port operations is available from the Army Safety Center for units desiring more detail.

Preparation

■ Establish a vehicle loading plan for sea shipment. Include nested vehicles (vehicles loaded on or in other vehicles) and blocking and bracing material requirements for all general cargo.

■ Do not overgross prime mover carrying a nested vehicle.

■ Always block, brace, and tie down both nested vehicles and general cargo.

■ Inspect shackle support and supporting vehicle structure to make sure it is in good shape and that welds on shackle bracket are sound.

■ Check each vehicle for condition of all lifting shackles, proper size of shackle, and proper size of shackle pin and cotter key.

■ Always carry extra shackles for unit vehicles.

■ Identify lifting shackles by painting the word "LIFT" next to them. Paint "TIEDOWN ONLY" next to tiedown shackles.

■ Ensure secondary loads are secured to prevent motion-induced damage.

■ AUEL/LOGMARS data must reflect actual "as shipped" weight, not "as published" weights. In some cases, units have shipped 5-ton trailers with as much as 10 tons of cargo.

■ Shippers must provide accurate LOGMARS data and segregate hazardous cargo.

■ Prior to arrival, explain the unit's terminal control plan to the driving and supervisory teams.

■ Stress unit integrity, NCO control, "don't wander around" philosophy.

■ Allow only essential personnel to enter staging areas while staging areas are filling.

■ Do not leave loose items in vehicle cabs.

■ Always check with the departure port Army terminal unit for the latest in-country standards for fuel tank levels and 5-gallon fuel-can levels.

■ Ensure vehicles containing compressed gas cylinders (other than fire extinguishers) are placarded on both sides of the vehicle with standard hazardous cargo placards.

■ Remove oxygen and acetylene cylinders from wreckers and maintenance vehicles.

■ Make sure gas cylinder bottles have caps and that caps are secured.

■ Ensure that any vehicle with brake problems has a big steering wheel placard stating, "CAUTION, NO BRAKES. DO NOT DRIVE. MOVE WITH TOW BAR ONLY."

■ Milvans and conexes must be certified as either hazardous or nonhazardous.

■ Keep vehicles free from hanging materials such as chains or ropes that could snag on a cleat or tiedown fitting and yank cargo off a truck.

■ Secure radio whip antennas upon entering terminal. Remove antennas from tracked vehicles and store inside vehicle.

■ Put main gun of tanks and fighting vehicles in travel lock position.

■ Obey terminal speed limit (normally 15 mph, or about the speed of a brisk walk).

■ Have a final check team go through the unit's vehicles after all the troops are assembled to check for mistakes, oversights, items left behind, shackles, lights or radios left on, etc.

■ Before departing the terminal, perform a rollcall/ accountability check.

Ground guide checklist

■ Have all personnel been trained in proper use of ground guides and how to act as ground guides?

■ Have drivers been instructed to use ground guides when backing and in congested areas—two ground guides when vision is restricted and at all times by tracked vehicles?

■ Do drivers keep ground guides in view at all times?

■ Are ground guides reminded never to walk backwards?

Off-limits areas

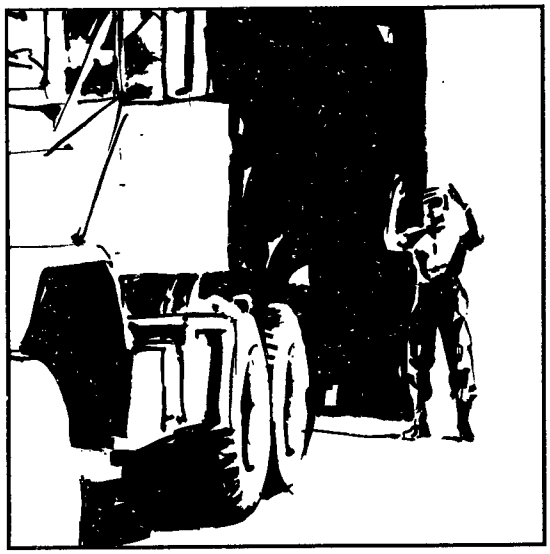
- Keep unauthorized personnel out of area.
- Establish and enforce no-smoking areas.

Slippery surfaces

- Remind personnel that slippery surfaces are common throughout the port area and to be continuously alert to avoid slipping.
- Clean up spills as soon as possible.

General

- Identify and require nonswimmers to wear personal flotation devices when near water.
- Inform personnel that port is a hardhat area and brief them to stay alert for movement in all directions.
- Instruct personnel never to walk or drive under a suspended load.
- Brief personnel about the dangers of working around open hatches on ships. (Some of the newer ships have no hatch openings.)



Section III

Annual Training

This section addresses areas of concern during Annual Training. Listed under each area are actions leaders should take to reduce the hazards.

All Vehicles

Improving safety in vehicle operations can provide the greatest single safety payoff in reduced accidents and injuries. Following are actions leaders can take to make that happen.

General

- Remind drivers of the importance of daily PMCS.
- Establish safe speed limits for various road and environmental conditions and *enforce them.*
- Enforce the requirement to use safety belts.
- Train all personnel in how to use and how to act as ground guides.

Rollovers

■ Remind drivers of conditions that lead to rollovers: approaching curves too fast and driving too fast on wet or icy roads.

■ Conduct rollover crew drills.

■ Ensure equipment is secured inside vehicles to prevent injury from falling objects in the event of a rollover.

■ Remind drivers to slow down for rough terrain, limited visibility, and inclement weather.

■ Plan vehicle moves to avoid steep slopes and narrow roads and trails.

■ Require drivers to give special care to operator-manual tire, track, and suspension checks.

■ Caution drivers to make wide turns at slow speed to maintain vehicle control.

Rear-end collision avoidance

■ Establish procedures to warn approaching vehicles in blackout, dust, and other restricted visibility conditions of vehicles that are stopped or broken down.

■ Establish and enforce safe following distances.

■ Ensure that drivers turn off blackout markers when NVGs are used.

■ If there are not enough NVGs for all drivers in a convoy, group all NVG-equipped vehicles together at the rear of the convoy, behind a vehicle with blackout markers off.

Passengers/cargo transport

■ Supervise cargo loading to ensure load is secured and weight correctly distributed.

■ Enforce the wear of safety belts and kevlar helmets.

■ Ensure that, whenever possible, fixed seating is provided for truck cargo-bed passengers.

■ In cargo beds without fixed seating, ensure that passengers remain seated within the truck body.

Crew coordination

■ Stress the importance of crew communication.

■ Remind drivers to warn crew/passengers when they are

about to cross a ditch, climb an obstacle, or take any action likely to catch crew/passengers off balance.

Combat Vehicles

In addition to the actions outlined above for all vehicles, leaders should emphasize the following in their combat vehicle operations.

Hatches and latches

- Require daily PMCS to ensure hatches and doors are functioning correctly.
- Make sure safety pins are present, operational, and used.
- Ensure that bad latches and pins are replaced immediately.
- Require that crews check hatch, latch, and pin function throughout the mission.
- Require that crewmembers notify each other of unserviceable hatches and doors and also mark improperly working hatches and doors with chalk or some other marker to warn others.

Turrets

- Brief and train crewmembers and passengers about turret hazards.
- Stress the importance of announcing "power" before traversing the turret.
- Remind crews to turn turret power off before leaving turret station.
- Do not tolerate horseplay or unnecessary access to the turret from the interior of the vehicle.
- Advise crew and passengers on the tactical situation so they can anticipate turret movements.

Fires

- Practice crew drills for emergency fire escape.
- Require complete electrical and fuel system inspections (no loose connections, no frayed or worn wires or lines, and no wires or lines that run over hot or sharp objects).
- Train/supervise crew activities involving ammunition

care and handling.

■ Train on "caseless" cartridge peculiarities.

■ Require inspection of fire extinguisher bottles to ensure they have been tested, weighed, and properly connected to discharge lines and external pull handles.

■ Require refresher instruction for crewmembers in proper extinguisher operation.

■ Ensure that fire detectors are cleaned as often as dictated by environmental conditions.

General

■ Ensure that soldiers get help to mount/load heavy objects.

■ Require that head protection (CVC or kevlar helmet) be worn in and around vehicles.

■ Stress hazards of slippery footgear and vehicle surfaces.

■ Emphasize use of gloves (protection from extremely hot or cold surfaces).

■ Remind crews to maintain three points of contact while moving about the vehicle.

■ Do not allow soldiers to jump from vehicles.

■ Do not allow soldiers to ride on outside of vehicle.

■ Do not allow smoking on or near the vehicles.

Maintenance Operations

Maintenance accidents accounted for almost 10 percent of all Army ground accidents during the past 3 years and cost $23.1 million. Following are actions leaders can take to prevent maintenance-related accidents.

Tire checks

■ Ensure that tires are checked often for cuts and wear.

■ Remind drivers to check for rocks between duals.

■ Ensure tires are properly inflated. If tire is flat or low (less than 80 percent of rated psi), tire must be removed and reinflated in tire cage.

Tire repair

■ Insist that operators/mechanics always use a tire cage.

■ Remind mechanics to use proper tools, to keep hands out of cage while inflating, and to use an extension inflator gauge.

■ Remind operators/mechanics to use the buddy system when lifting, removing, and installing large tires.

Batteries

■ Remind personnel to keep air vents on caps clean to allow gas release and avoid pressure buildup.

■ Ensure that personnel check levels often. (Battery electrolyte water evaporates faster in extremely hot weather.)

■ Ensure that personnel adjust battery electrolyte levels during the day. (When batteries cool, levels will lower slightly and overflow will be avoided.)

■ Require the use of slave cables. Only as a last resort should jumper cables be used. Remind personnel to beware of sparks as cables are attached around the battery's gaseous vapors.

■ Ensure that mechanics adjust voltage regulators to lowest setting possible to avoid overcharging.

■ Require the use of face shields, goggles, and aprons when servicing batteries.

Recovery operations

■ Remind recovery personnel to use a braking vehicle when required by TM and to always use correct hookup procedures.

■ Caution soldiers to keep hands and clothing at least 5 feet from winch when rewinding cable after recovery operations.

■ Wear gloves when handling cables.

■ Remind soldiers to avoid walking between vehicles.

■ Caution soldiers to make sure that parking brakes are set, vehicles are in gear, and chock blocks are used when working on hookups.

■ Enforce safe towing speeds.

Brakes

■ Require that operators manual be used when inspecting

brake systems.

■ Require that every brake problem be reported to the supervisor immediately.

Radiators/coolants

■ Remind personnel to use caution when removing radiator caps from hot vehicles and to check radiator fluids often to avoid overheating. (Use hand to remove cap only if cool to touch. Turn cap slowly to release pressure.)

■ Remind personnel to keep radiators and airflow areas clean and free of debris to avoid rupture and overheating of radiators.

■ Require that radiator caps be tested often. (Caps control radiator pressure.)

■ Keep fingers clear of fan and fan belts.

Jewelry

■ Prohibit the wearing of rings when working or climbing on vehicles.

Grounding

■ Ensure that portable electric power tools and power-generating equipment are properly grounded.

Ground guides

■ Require the use of ground guides when moving equipment in and around maintenance areas.

Fire

■ Develop and post a fire plan.

■ Brief each individual on their responsibilities.

■ Inspect fire plan and equipment weekly.

Ground Guiding

■ Train drivers in the correct use of ground guides and *all* personnel in how to perform as ground guides.

■ Stress importance of ground guides when traveling cross country during periods of limited visibility.

■ Remind drivers to always use one or more ground guides while backing.

■ Equip ground guides with suitable lights during periods of limited visibility/darkness.

Petroleum, Oil, and Lubricants (POL)

Commanders should implement a training program for personnel involved with handling POL and ensure that leaders provide close supervision of the following:

Fuel points

■ Brief operators on location of pre-positioned fuel points along convoy routes.

■ Establish adequate spacing at fuel points.

■ Establish a POL servicing point and rotate stock.

■ Establish a checkpoint at which smoking materials must be extinguished and lighting devices collected and stored.

■ Ensure that self-closing metal containers are used for trash.

■ Ensure that drip pans and dry sweep are available and used at fuel site.

■ Prohibit the use of fuel for cleaning.

■ Ensure that fuel handlers are properly trained and licensed.

■ Conduct training on fuel spills, fire plans, and evacuation procedures.

■ Ensure that a grounding system is established and used during refueling.

■ Ensure that fire extinguishers are on hand and serviceable.

■ Establish emergency shutdown procedures.

■ Ensure that oils are never stored with paints.

■ Require daily inspection of tanks, hoses, pumps, filters, nozzles, and hose joints.

■ Ensure that fuel operations stop if thunderstorms are within 5 miles.

■ During night operations, ensure that hazards are marked with reflective tape or chemical lights. In addition, ensure that personnel at refueling sites wear reflective clothing and use spark-resistant flashlights.

Marking

- Ensure that fuel containers are properly marked.
- Ensure that No Smoking signs are placed so that they can be seen.
- Ensure that fuel transport vehicle markings conform to DOT regulations.

Refueling operations

- Ensure that drivers know their responsibilities:
  - Shut down vehicle, turn off radios.
  - Get out with passengers.
- Ensure that fuel tank operators know their responsibilities:
  - Position fire extinguishers.
  - Ground the vehicle.
  - During refueling, bond the nozzle to the vehicle being fueled by using a bonding cable.

Bivouac

Sleeping areas

- Establish a designated sleeping area. If situation permits, mark perimeter with engineer tape or chem lights. Select a position a safe distance from known vehicle travel routes and potential avenues of approach.
- Post unit perimeter security personnel equipped with lights for signaling. Ensure they are thoroughly briefed on their duties and responsibilities.
- Ensure vehicles are *not* parked where they can roll toward sleeping personnel or on an incline without chocks.
- Prohibit personnel from sleeping in vehicles with engine running.
- Require that, before moving a vehicle, drivers walk around it to ensure the area is clear.

Dismount points

- Establish dismount points beyond which vehicles may not move without ground guides.

Ground guiding

- Require that all vehicles use ground guides, especially

during periods of darkness and reduced visibility.

■ Require that tracked vehicles use two ground guides when moving within or through an assembly area at any time.

Tents

■ Ensure that stovepipes extend above the top of tents (spark arrestor is required).

■ Ensure that stoves are not operated at full capacity.

■ Require that electrical circuits be routinely inspected for possible overload conditions.

■ Ensure that personnel prevent stove fuel from leaking and require immediate cleanup of any spills.

■ Establish and enforce use of smoking areas.

■ Use tent liners as added insulation from heat and cold.

■ If rebar or other sharp-topped items are used as tent stakes, cover the stakes to protect personnel from being cut on the sharp edges. Overturned plastic water bottles are an excellent cover for the stakes.

Fire/explosion

■ Ensure that kitchen and other fuel storage areas are at least 15 meters from working areas and clearly marked as a hazard area.

■ Ensure that operable fire extinguishers are accessible (with *designated operators*) in all fire hazard areas. This includes stove-lighting areas for kitchen operations.

■ Ensure that all personnel fueling or operating stoves, immersion heaters, tent heaters, and kitchen burners are properly trained.

■ Make operators aware that increased heat adds pressure to fuel tanks and fuel cans. Particular attention should be given to M2 burners.

■ Keep all entrances and exits to mess/sleeping/working shelters clear of obstructions.

Weapons Handling

Fratricide

■ Do not tolerate horseplay.

■ Ensure weapons are kept on safe.

■ Remind soldiers to consider weapons loaded at all times and to check chamber often.

■ Instruct soldiers to know their target. Train in target identification.

■ Require strict control of weapons and ammunition.

■ Review the dangers of cookoffs.

■ Rehearse immediate-action drills for misfire/weapons malfunctions.

■ Remind soldiers to clear for backblast when firing anti-armor weapons.

■ Ensure that soldiers receive correct ammunition for the weapon system to be used. Refer to the operator's manual when in doubt.

■ Ensure that blank and live ammunition are not mixed.

Maintenance

■ Establish a weapons-lubrication policy.

■ Enforce weapon, ammo, and magazine cleanliness standards.

■ Ensure that muzzles are covered to prevent clogging.

■ Set headspace and timing in accordance with TM. Caution soldiers not to rely on memory, to always verify.

Lasers

■ Use only trained personnel to operate/handle lasers.

■ Caution personnel to fire lasers only at designated targets and to never fire at specular surfaces such as glass, mirrors, and windows.

■ Ensure that laser safety filters are installed on binoculars and other optical devices when observing laser operations.

■ Ensure that eye protection is available and worn.

■ Ensure that laser safety procedures are established and implemented for each device being used.

■ Conduct safety briefings on all Class II and higher lasers, specifying required eye protection and viewing limitations.

Parachuting

- Review conditions on the drop zone.
- Rehearse actions to be conducted on the DZ after the jump.
- Review parachute landing falls.
- Review emergency landing procedures.
- Ensure corrective lens are worn by personnel who require them.
- Require helmets on all jumps.
- Limit loads to jumper's capability; excess weight will increase the probability of a weak exit.
- Ensure that obstacles on and around the drop zone are marked.
- Stress a 1-second interval, good door position, and correct exit procedures.
- Place special emphasis on towed parachutist procedures, equipment tiedowns, and accidental reserve activations.
- Brief jumpmasters to ensure that the reserve parachute does not catch and activate during towed parachutist retrieving procedures.
- Review reserve parachute activation procedures and ensure jumpers know what method to use based on the situation.
- Review procedures for jumping with weapons exposed.
- If operating in the desert, thoroughly cover depth perception.
- For night jumps, ensure that all jumpers go through the five points of performance. Place special emphasis on getting into the fifth one ASAP because determining altitude at night is sometimes difficult.
- Ensure that only red lights are used 30 minutes before and during night jumps. Use of white lights may degrade jumpers' night vision.
- Rehearse intended night halo jumps during daylight when the situation permits.
- Require an experienced buddy to assist inexperienced jumpers.
- Ensure jumpmasters know and identify the correct release point.
- Use door bundles for extra equipment and ammunition.

- Review crossloading plan.
- Conduct aircraft crash drills.

Rappelling/Fast Rope

- Use trained personnel.
- Conduct briefing with aircrew.
- Perform safety and serviceability checks on all equipment.
- Keep rucksacks under 50 pounds.
- Ensure that helmet and gloves are used.
- Prohibit cutting of ropes except in an emergency—and only after visual confirmation that the rope is clear.
- Ensure that all participants understand and can execute techniques and responsibilities for the operation.
- Ensure that two safeties are on board to clear ropes and make sure that 5 to 6 feet of rope are on the ground.
- Ensure that safeties wear NVGs when required.

Helocast and Recovery

- Prior to helocast operations, ensure that—
  - All participants receive refresher training.
  - Immediately before the operation, have the cast area physically reconnoitered to verify water depth and the absence of obstacles and debris.
- Require that water depth be at least 15 feet.
- Require that two safety boats with motors running be in the water to conduct helocast and recovery operations. Absence of boats with motors constitutes a no-drop.
- Ensure that radio voice communications are established between the drop aircraft and the safety boat. No commo constitutes a no-drop.
- Ensure that aircrews know that—
  - Drop altitude will not exceed 20 feet above the surface of the water (5 feet when launching the RRC).
  - Drop speed will not exceed 20 knots indicated airspeed.
  - Recovery speed will not exceed 15 knots indicated airspeed.
  - In the event of a injured swimmer, operations will cease until extent of the injury is determined.

NBC Operations

MOPP

■ Caution soldiers that protective masks will require more PMCS in a hot, sandy environment. (Sand will clog filters and cause valves to malfunction.)

■ Ensure that soldiers know that prongs on prong-type optical inserts must be *fully* seated into adjacent holes to prevent the possibility of their coming out when the mask is donned and injuring the face or eyes.

■ Remind soldiers that amyl acetate (banana oil) vapor is toxic and flammable. Checking the seal of the protective mask should be done in a well-ventilated area away from heat and flames.

■ Increase WBGT by 10°F for operations in MOPP, and increase water consumption accordingly.

■ Have soldiers practice drinking while wearing mask.

■ Institute a command drinking policy. Require soldiers to drink periodically on command even in moderate temperature conditions.

■ Plan additional time to conduct operations (up to 6 times longer). Rotate personnel more often.

■ Allow personnel to loosen protective clothing as tactical scenario allows. Remember that MOPP is a *flexible* system.

■ Employ buddy system to check for heat injuries. Ensure that leaders are included.

■ Delegate tasks to subordinates to reduce stress and fatigue. (Experience shows that leaders are most likely to suffer adverse effects of operating in MOPP.)

HC smoke

■ Ensure that all personnel have protective mask available before conducting training using HC smoke.

■ Have personnel mask when—

- ❑ Using smoke during MOUT training in enclosed spaces.
- ❑ Operating in dense smoke (visibility less than 50 meters).
- ❑ Operating in a smoke haze (visibility greater than 50 meters) for more than 4 hours.

■ Emphasize that smoke grenades and smoke pots can start

fires. Caution soldiers not to ignite them around flammable materials.

■ Warn soldiers that burning grenades and pots in an enclosed space can displace oxygen, creating an asphyxiation hazard.

Riot control agents (RCAs) (CS)

■ Have a chemical officer or NCO or an officer or NCO with an NBC additional skill identifier (ASI) present before conducting training with RCAs.

■ Use RCAs only in approved areas.

■ Have personnel medically evaluated before conducting training with RCAs.

■ Ensure that personnel do not wear contact lenses (they should use optical inserts in the protective mask).

■ Ensure that only CS capsules are used in the CS chamber.

■ Caution soldiers not to throw CS grenades within 10 meters of personnel.

■ Emphasize that CS grenades are hot and may start fires if used near flammable materials.

M43 protective mask

■ Do not expose blower or battery pack to temperatures above 160°F.

■ Do not allow battery pack or blower to remain in contact with hot metal surfaces.

Power-driven decontaminating systems

■ Ground the M12A1 and M17A1 decon systems when refueling.

Fires

■ Store DS2 and STB separately.

■ Do not spray DS2 on hot metal surfaces.

Chemical burns

■ Store containers of DS2, STB, and the M13 decon apparatus out of direct sun to avoid leaking.

■ Remind users to wear rubber gloves when handling containers of decontaminants.

■ Ensure that leaking containers of decontaminants are disposed of through the DRMO.

Engineer Equipment

General

■ Remind operators that construction equipment may be very unstable off road in sandy and rocky terrain.

■ Ensure that operators and supervisors check outriggers for stability. This is especially critical in sand or soil where a thin surface crust may exist.

■ Ensure that safety belts are worn at all times when operating equipment.

■ Inspect all leased equipment to ensure it meets safety standards.

■ Ensure that all prime movers and trailer brake systems are fully operational on equipment haulers.

■ Rehearse braking and downhill driving procedures with all operators.

Bridge erection boat (BEB)

■ Emphasize that the most critical times are launch and recovery of BEB.

■ Require that crews engage both electric (hydraulic) and parking brakes during boat preparation, launching, and retrieval ramp operations.

■ Have an operator in the vehicle cab whenever the truck is parked on an inclined ramp or during launch and retrieval operations.

■ Require the use of personal flotation devices (PFD). Require personnel to don their PFD before entering a BEB that is on, over, or near the water.

■ Establish man-overboard drill and rehearse it.

■ Identify nonswimmers and establish a buddy system.

■ Brief crews on what to do in the event of a capsized boat.

M915 series

■ Ensure that operators of M915 series vehicles are familiar with emergency downhill braking procedures.

Water Crossings

Accidents that occur during water crossing operations are usually related to specific pieces of equipment. Tips related to these items can be found among the tips listed for the specific equipment.

General

- Ensure that nonswimmers are identified.
- Place nonswimmers and weak swimmers near qualified swimmers.
- Ensure that personal flotation devices are adequate to the type of mission and the uniform soldiers are wearing.
- Assign emergency support personnel (medics, lifeguards, safety NCO/officer) no duties other than emergency support.
- Establish contingency plans in the event of electrical storms.
- Consider alternatives to foot crossing if current exceeds 3.5 meters (11 feet) per second or if water or air temperature is less than 45°F.
- Ensure that entry and exit points are marked clearly.
- Don't allow vehicle occupancy to exceed specifications in vehicle technical manuals.
- Brief personnel that vehicle occupants will not wear safety belts during fording.

Rafting operations

- Ensure that only the vehicle commander and driver occupy the vehicle being driven onto the raft.
- Ensure that tracked vehicle hatches and wheeled vehicle windows are open and secured.
- Brief operators to use the lowest possible transmission gear.
- Ensure that chocks are properly used.
- Remind personnel that rafting in debris-laden water is dangerous.

Assault boat operations

- Brief soldiers to remove and store protective masks, backpacks, load bearing equipment, and rubber overshoes.
- Ensure that weapons are secured or carried at port arms.

■ Ensure that non-motorized assault boats are not used when water currents exceed 1.5 meters per second.

■ Don't allow assault boats to operate upstream within 1 kilometer of float bridges.

Ammunition & Explosives

Simulators and pyrotechnics can cause serious injuries when handled improperly. Guidance on handling pyrotechnics and simulators is contained in TM 9-1370-207-10: Pyrotechnic Simulators Operators Manual and TM 9-1370-208-10: Photoflash Cartridges, Surface Flares and Miscellaneous Pyrotechnic Items.

■ Caution soldiers that only qualified ammunition personnel (55 series MOSs) are authorized to dispose of dud/misfired simulators and pyrotechnics.

■ Remind soldiers never to throw a simulator at or near personnel. (TMs 9-1370-207-10 and 9-1370-208-10 provide safe separation distances for personnel when using simulators.)

■ Caution soldiers never to store or transport corrosives, flammables, and ammunition together.

■ Ensure that positive control is maintained over all ammunition and explosives.

■ Ensure that live and blank ammunition is never stored together.

■ Caution soldiers that seemingly harmless simulators are dangerous. They must not be tampered with in any manner.

■ Conduct random "shakedown" inspections to discourage hiding of ammo and simulators (in wall lockers, etc.).

Personal Injuries

Injuries to the eyes, head, hands, back, and feet are caused primarily by failure to wear personal protective clothing and equipment; slips, trips, and falls; and failure to handle cutting devices properly.

Eyes

■ Ensure that protective eye gear is worn during high-risk operations, including the following:

- ❑ Welding.
- ❑ Painting.
- ❑ Grinding.
- ❑ Fuel handling.
- ❑ Maintenance/repair.
- ❑ Woodworking.
- ❑ Metal work.
- ❑ Heavy equipment operation.
- ❑ Electrical work.
- ❑ Vehicle operations when windshield is down or head is outside the hatch in tracked vehicles.

Ears

■ Ensure that personnel use proper hearing protection when equipment noise exceeds 85 decibels. The following equipment exceeds this noise level:

- ❑ All Army aircraft.
- ❑ Construction/engineer items such as dozers, cranes, forklifts, graders, etc.
- ❑ Tractors.
- ❑ Tracked vehicle engines (APCs, tanks, etc.).
- ❑ Multifuel vehicle engines.
- ❑ Small arms.
- ❑ Vulcan gun.
- ❑ Grenade launchers.
- ❑ Missile systems.
- ❑ Mortars.
- ❑ Guns (tanks, howitzers).
- ❑ Mines.
- ❑ .50 caliber machinegun.
- ❑ Rockets.
- ❑ HMMWV family of vehicles.

Head

■ Ensure that helmets are worn at all times by all personnel riding in or operating Army combat vehicles.

■ Ensure that helmets or hardhats are worn in construction

areas in accordance with SOPs and local and Army regulations.

Hands

- Require that all personnel remove rings before working around equipment.
- Caution soldiers that "hung" rings are common when debarking vehicles, causing severe finger injuries.
- Ensure that soldiers use the proper tool for the job.
- Remind soldiers to ensure that hands and fingers are clear before opening or closing doors, hatches, and tailgates.

Feet

- Ensure that protective boots or shoes are worn in areas that require toe protection.
- Ensure that the following personnel wear protective foot gear:
  - Electrical workers.
  - Mechanics (tracked and wheeled vehicles, aircraft).
  - Carpenters.
  - Heavy equipment operators.
  - Warehouse workers.

Slips, trips, and falls

- Supervise operations.
- Ensure that areas are clear of obstructions and hazards, and remind personnel to use care when vision is obstructed by objects being carried.
- Caution personnel not to jump or step from cargo vehicles while carrying loads; tell them to use a ramp or get help.
- Remind personnel to use extreme care when carrying loads in loose soil or on rough surfaces.
- Enforce the three-points-of-contact rule when operating or working on top of armored vehicles.

Bunker Construction

- Ensure adequate material is available; inspect it for potential structural weakness.
- Inspect and test position daily and after heavy rain and

any activity that may cause changes in structural strength.

■ Revet excavations in loose soil.

■ Ensure that proper lateral bracing is used.

■ Ensure that soldiers follow the standards for construction of bunkers and fighting positions (FM 5-103: Survivability; FM 5-34: Engineer Field Data).

■ Brief soldiers to be alert for any indications of material failure (wood-cracking sound, falling sand or soil) and to evacuate the bunker/fighting position as soon as possible.

■ Don't allow soldiers to sleep inside bunkers/fighting positions.

Aviation Operations

This section addresses areas of concern in aviation operations. Listed under each area are actions to take to reduce the hazards.

Command and control

■ Commander should personally brief each mission using a mission briefing sheet.

■ The mission briefing should designate who is in charge and in control of each aircraft before it leaves the ground.

■ Commander or operations officer should ensure that every facet of the mission or tactical operation is planned and executed in accordance with that plan.

■ Commander or operations officer should debrief or critique each mission.

Crew selection/scheduling

■ Formalize and use a risk management program to aid in proper selection of aircrews.

■ Ensure that both pilot and crew proficiency is appropriate for every mission flown.

■ Assign specific crew responsibilities. (The commander or operations officer assigns the crew; the PC assigns individual crew responsibilities during mission briefing and planning.)

■ If there is no operations officer to make crew selection/scheduling decisions, ensure that designated platoon or section leaders are adequately trained and counseled on their crew selection/scheduling responsibilities.

■ Don't forget individual crew training needs when scheduling missions and crews.

■ Ensure a crew-rest program is established and included in the unit SOP.

■ Establish steps to monitor the crew endurance program to ensure crew compliance. Don't forget to consider support personnel when considering crew endurance.

Crew coordination

■ Stress positive communication in the cockpit. Communication is positive when the sender directs/announces/requests/offers, the receiver acknowledges, and the sender confirms using standard terminology to ensure understanding.

❑ The pilot on the controls will direct actions of nonflying pilot and other crewmembers necessary to maintain aircraft control and operation.

❑ The nonflying pilot and other crewmembers will offer assistance or information immediately when directed by the pilot on the controls or when a situation exists that warrants the assistance or information. Crewmembers should not simply assume that the pilot on the controls has identified an existing hazard.

❑ Each crewmember will announce decisions made or actions planned that affect the duties of another crewmember.

Airspace

■ Brief all aviators on the training area, to include—

- ❑ Hazards map.
- ❑ Airspace restrictions.
- ❑ Local FAA procedures.
- ❑ Airfield procedures.
- ❑ Range operations.
- ❑ Off-installation noise and low-flying-restricted areas.
- ❑ Crash rescue and crash alarm.
- ❑ Weather facilities.

■ Require orientation flight of training area even if most personnel have trained there before.

Wire-strike prevention

■ Make sure that thorough hazard and obstacle briefings are conducted before every low-level mission.

■ Mark all wires in operational areas.

■ Mark all wires on current hazard maps.

■ Ensure maximum crew coordination in searching out and calling out wires.

■ Emphasize need for pilots to go slow when they go low.

■ Operations officers—provide hazard maps and brief aviators on wire hazards.

■ Aviation safety officers—promote wire-strike prevention in safety meetings and closely monitor flight crew scheduling, briefings/debriefings, and posting, use, and availability of wire hazard maps.

■ IPs—practice, teach, and reinforce wire-strike prevention criteria and commonsense rules for detecting and avoiding wires.

■ PICs—assign copilots and crew chiefs specific cockpit tasks and duties. Open lines of communication must exist between the pilot at the controls and those navigating and/or clearing the aircraft in all quadrants.

■ Pilots—avoid taking shortcuts. Remain conscious of basic wire-strike prevention measures and *think* wires constantly while flying in the terrain flight mode.

■ Maintenance personnel—ensure that all aircraft windows (front and side) are clean. Clean windows are essential to allow pilots to use their peripheral vision for detecting obstacles.

Brownout

■ Ensure crews are familiar with procedures in aircraft operator's manual; chapter 2, FM 1-202: Environmental Flight; and TC 1-13: Hot Weather Flying Sense.

■ Remind crews that brownout is an inadvertent IMC condition and should be treated as such.

Night vision goggle operations

■ Check crew rest policy for NVG operations.

■ Review crew selection procedures. Avoid pairing inexperienced crewmembers.

■ Check goggle operation and maintenance procedures.

■ Stress the importance of aircraft windscreen maintenance and lighting configuration and maintenance.

■ Ensure that aircrews are afforded the time and the environment to sufficiently adapt to darkness.

■ Ensure that ambient light levels are considered during mission planning.

■ Give special consideration when operating in areas of low contrast such as those existing in the National Training Center and Western Army Aviation Training Site. (Check the draft Appendix E (Aviation NVG Desert Training and Operations Planning Guide) to TC 1-204, available from Commander, U.S. Army Aviation Center, ATTN: ATZQ-ATB-NS (NVDB), Fort Rucker, AL 36362, AV 558-5858/5812.)

■ Caution crews not to overfly NVGs—reduce airspeed to give more reaction time.

■ Emphasize the importance of continuous scanning (scan stop of more than 3 seconds is risky).

■ Establish procedures for crewmember disorientation during NVG operations. (This situation should be treated as an inadvertent IMC condition.)

■ See June 1991 *Flightfax* for a consolidated listing of messages involving NVG maintenance and operations.

Maintenance management

■ Ensure that all positions are filled with qualified mechanics.

■ Ensure that SOPs cover all aspects of the unit mission.

■ Ensure that the following positions are filled with qualified personnel:

- ❑ Technical inspectors.
- ❑ Weight and balance technician.
- ❑ Oil analysis monitor.
- ❑ Safety officer and NCO.
- ❑ Test pilot.
- ❑ Control exchange authority.
- ❑ FOD officer.

■ Ensure proper transportation and condition of electrical test sets.

Forward arming and refueling points (FARP)

■ Ensure fuel and ammunition handlers are familiar with FM 10-68 and FM 1-104 procedures.

■ Require daily inspection of grounding/bonding systems.

■ Use extreme care when handling engine fuel at high temperatures to prevent possible sparks and explosion. Open gasoline drums with bronze or other nonsparking tools.

■ Ensure that the nozzle bonding wire is connected before opening the fuel cap to prevent a static arc from occurring in the presence of fuel vapor.

■ Look for and correct improper grounding points, deteriorated or leaking hoses, leaking nozzles, incorrect sampling procedures, improper storing and dumping of waste POL products, lack of personal protective equipment for refueling personnel, no water at refueling sites, unserviceable fire extinguishers, and no controlled access into and out of refuel points.

■ Keep fuel drums covered and, where possible, maintain storage temperature below 120°F.

■ Remember that fuel expands in very hot temperatures.

■ Ensure that fuel does not become contaminated by dirty nozzles and other unclean equipment.

■ Consider positive control of air traffic and ground traffic around refueling sites to reduce potential of midair/ground collisions.

■ Keep camouflage materials (netting/foliage) as far from rotor blade systems as possible to prevent FOD.

■ Enforce requirement for at least two qualified personnel to arm an aircraft.

■ Ensure weapons are on safe before arming.

■ Ensure guns are oriented away from bivouac areas, buildings, etc., before arming or rearming.

■ Require frequent cleaning and lubrication of turret weapon systems to prevent jamming due to dirt and sand.

■ Do not operate high-frequency radios within 100 feet of aircraft being armed or refueled.

Cold Weather Conditions

Prevention

All too often we focus on recognizing and treating cold weather injuries. However, the more important issue is prevention. Consequently, leaders should be trained on the following precautions and supervisory responsibilities to prevent cold injuries:

■ Enforce buddy system.

■ Check each soldier for proper dress (gloves; loose, layered clothing).

■ Ensure proper hygiene is practiced.

■ Never allow a soldier to unnecessarily wear wet clothing.

■ Require soldiers to change socks regularly.

■ Identify and closely monitor personnel who have previously suffered a cold-weather injury (they are more susceptible).

■ Remind soldiers that alcohol consumption increases the risk of cold injuries.

Signs, symptoms, and first aid

When prevention fails it is critical that everyone be able to recognize and treat cold-weather injuries. Following are the most common ones:

■ **Frostbite** is caused by freezing of tissue, normally due to exposure below 32°F. Seek treatment even if suspected.

- Symptoms: Loss of sensation in affected area; tingling, blistered, swollen, or tender areas; pale, yellowish, waxy-looking skin (grayish in dark-skinned soldiers).
- First aid: Warm the affected area with direct body heat.

Do not massage or rub, wet, use ice or snow, or expose the affected area to fire or other source of intense heat.

■ **Chilblain** is caused by repeated exposure of bare skin for prolonged periods to temperatures from 20°F and as high as 60°F for those not acclimated to cold weather.

❑ Symptoms: Swollen, red skin (darkening of skin in dark-skinned soldiers); tender, hot skin usually accompanied by itching.

❑ First aid: Same as frostbite.

■ **Immersion foot** (trench foot) is caused by prolonged exposure of feet to wet conditions at temperatures between 32°F and 50°F. Inactivity and damp socks and boots (or tightly laced boots that impair circulation) speed the onset and severity.

❑ Symptoms: Cold feet, which may become numb; feet may later feel hot with shooting pain. There may also be swelling, redness, and bleeding.

❑ First aid: Rewarm feet by exposing to warm air; evacuate victim for medical attention. Do not massage, rub, moisten, or expose affected area to intense heat.

■ **Dehydration**, which is depletion of body fluids, is as common in cold weather as in hot.

❑ Symptoms: Nausea, dizziness, weakness, and blurred vision.

❑ First aid: Hydration.

■ **Hypothermia** is a life-threatening situation caused by prolonged cold exposure and body-heat loss. This may occur at temperatures well above freezing, especially when a person is immersed in water.

❑ Symptoms: Shivering stops; drowsiness, mental slowness, uncoordination; unconsciousness; irregular heartbeat.

❑ First aid: Strip off wet clothing; wrap victim in blankets or put in sleeping bag; get victim to heated location; evacuate to medical facility.

■ **Carbon monoxide** is a poisonous gas that is most commonly generated by exhaust fumes from vehicles or other internal combustion engines.

❑ Symptoms: Headache, weakness, dizziness, blurred vision, nausea, vomiting, unconsciousness.

❑ First aid: Move person to fresh air, summon medical assistance, administer artificial respiration if required.

Hot Weather Conditions

Prevention

Awareness of the Wet Bulb Globe Temperature (WBGT) and tailoring work in accordance with the guidance outlined below is the first step toward heat-injury prevention.

■ **Category 1: 78°F - 81.9°F.** Extremely intense physical exertion may cause heat exhaustion or heatstroke.

■ **Category 2: 82°F - 84.9°F.** Discretion should be used in planning heavy exercise for unseasoned personnel.

■ **Category 3: 85° F - 87.9°F.** Strenuous exercise such as marching at standard cadence should be suspended for unseasoned personnel. Outdoor classes in the sun should be avoided when the WBGT exceeds 85°F.

■ **Category 4: 88°F - 89.9°F.** Strenuous exercise should be curtailed for personnel with less than 12 weeks training in hot weather.

■ **Category 5: 90°F & above.** Physical training and strenuous exercise should be suspended for all personnel.

Water consumption/salt loss

In extreme heat, the body is cooled by sweat. Since sunburn inhibits sweating, every precaution must be taken to prevent sunburn. Common sense dictates maximum use of shade, sunscreen, and/or clothing that covers as much exposed skin as possible.

When the body loses water, it also loses salt. Salt should be replaced by normal consumption of food. Do not use salt tablets.

An individual may lose more than 1 quart of water per hour through sweating. Water must be replaced by frequent intake of small amounts of water. Water should be sipped, not gulped. Do not conserve water. Soldiers *must* drink even when they are not thirsty; thirst is not an adequate indicator of dehydration.

The following chart is a guideline for water requirements:

Activity	Typical Duties	Quarts per person per day for drinking WBGT*	
		less than 80°	more than 80°
Light	Desk work, guard work, radio operating	6	9
Moderate	Route march on level ground, tank operations	9	12
Heavy	Forced march, route march heavy load/MOPP, digging-in	12	15

Following these requirements will not necessarily prevent dehydration. Dark urine is an indicator of dehydration.

Alcohol and soft drinks are not substitutes for water. Alcohol exacerbates dehydration, and soft drinks are not absorbed as rapidly as water into body tissue. Soft drinks containing salts (e.g., Gatorade) may increase individuals' water requirements.

Soldiers who are overweight, dieting, or past heat casualties are more prone to heat injuries. As such, their activities must be closely monitored. Leaders must—

- Enforce hydration and monitor water use.
- Provide cool water when possible.
- Enforce work/rest cycles.
- Watch for signs of heat injury (know what they are).
- Know individual physical condition and assign appropriate work.
- Establish and ensure use of the buddy system.

Signs, symptoms, and first aid

- **Heat cramps** are caused primarily by excessive loss of salt from the body.
  - Symptoms: Muscle cramps of the abdomen, legs, or arms.
  - First aid: Move the victim to shade and loosen clothing;

dissolve ¼-teaspoon table salt in one quart of water, and have the victim slowly drink at least one quart of the salt solution; seek medical treatment.

■ **Heat exhaustion** is caused by excessive salt depletion and dehydration.

❑ Symptoms: Profuse sweating, headache, tingling sensation in the extremities, weakness, loss of appetite, dizziness, nausea, cramps, chills, and rapid breathing.

❑ First aid: Move victim to shade, loosen or remove clothing, elevate legs, pour water on the victim, have the victim drink water, and fan; seek medical treatment.

■ **Heatstroke** is a medical emergency; immediate action is required.

❑ Symptoms: Generally patterned after heat exhaustion; however, skin will be hot and dry; victim may suddenly lose consciousness and have seizures.

❑ First aid: Move victim to shade, immerse in water if possible (ice water is even better), douse with water and fan: seek immediate medical attention; elevate feet; ensure cooling process is continued during transport to medical facility.

Fatigue

Fatigue causes accidents. After 48 to 72 hours without sleep, soldiers become militarily ineffective. So, the best measure against fatigue is sleep. Water consumption, diet, physical conditioning, personal hygiene, and meaningful work all impact on fatigue. Ensure the impact is positive. Watch for the following symptoms of fatigue:

■ Headaches.
■ Poor personal hygiene.
■ Impatience/irritability.
■ Loss of appetite.
■ Inability to focus on task at hand.
■ Outright physical exhaustion.
■ Inability to make decisions.

These symptoms manifest themselves in:

■ Increased errors.

■ Difficulty in following instructions.
■ Lack of motivation.
■ Carelessness.

All this may translate into unnecessary risk-taking or shortcuts to get the job done—an open invitation for an accident.

Facts about sleep deprivation

■ You cannot train to overcome sleep loss.

■ Tasks that are uninteresting and take a long time are extremely conducive to sleep.

■ Performance of mental tasks requiring calculations, creativity, and ability to plan ahead declines by 25 percent for every 24-hour period of semi-continuous work without sleep.

■ The abilities of leaders are degraded by sleep loss, impacting on quick and effective responses to changing battlefield conditions.

■ Tasks that have been well-learned and repeatedly practiced are more resistant to sleep-loss effects (select the best trained to perform critical tasks).

■ The ability to learn *new* information is compromised by sleep loss.

■ Leadership ability cannot overcome sleep loss.

■ Sleep loss over time (greater than 2 days) has a cumulative effect.

Guidelines for sleep plans

■ 6 to 8 hours sleep each night will maintain mental task performance indefinitely.

■ 3 to 4 hours sleep each night will maintain mental task performance for 5 to 6 days.

■ Less than 4 hours sleep each night (over a 3- to 6-day period) will impair military effectiveness.

■ Best sleep periods given limited choice, are 0300 to 0600 and 1600 to 1900.

■ Provide for a *minimum* of 4 to 5 hours quality sleep (uninterrupted); however, after 6 to 7 days, accumulated sleep loss will equate to performance of 48 hours without sleep.

■ After 24 to 36 hours without sleep, decisions, calculations, etc., should be cross-checked by a second person. Use a mix of rested and unrested soldiers as check and balance.

■ Allow for naps as often as possible. Four 1-hour naps in a 24-hour period are as beneficial as 4 hours' sleep; however, accumulative sleep loss is more severe with fragmented sleep.

■ Sleep plans should include provisions to recover from sleep loss:

- 12 hours of sleep/rest (at least 8 to 10 hours sleep) are required after 36 to 48 hours acute sleep loss.
- 24 hours of sleep/rest (at least 15 hours sleep) are required after 36 to 48 hours sleep loss under conditions of high workload (12 to 16 hours per day). This is particularly important for commanders/staff with high mental task workloads.
- 2 to 3 days sleep/rest are required after 72 to 96 hours sleep loss. The sleep/rest period means 8 to 10 hours sleep per day and light duty.

Water Safety

Each year drowning accounts for the majority of recreational fatalities as well as a share of training fatalities.

■ Identify weak and non-swimmers prior to Annual Training.

■ Caution soldiers that cold water (70°F and below) is hazardous to even the best of swimmers.

■ Ensure that soldiers swim only in authorized areas.

■ Enforce the buddy system.

■ Designate strong swimmers or trained lifeguards.

■ Remind soldiers that alcohol and swimming do not mix.

■ Always check unfamiliar areas for underwater obstacles, current, water temperature, and sudden dropoffs.

■ Require the use of personal flotation devices when boating.

Sports Injuries

■ Ensure playing fields are free of poles, trees, and boulders.

■ Keep bleachers and other seating a safe distance from the playing field.

■ Ensure appropriate protective equipment is used.

■ Supervise/referee games. Do not allow combat rules to prevail.

Snake and Insect Bites

Bottom line—tell your soldiers to leave snakes alone. Even bites from nonpoisonous snakes can be harmful if they become infected. Snakes are coldblooded; consequently, they will seek warm spots. Anyone bitten should seek medical help immediately. If possible, attempt to identify the type of snake. Do not treat snakebites with the cut/suck method.

Scorpions, centipedes, black widow and brown recluse spiders, flies, mosquitoes, ticks, and sand fleas can cause illness and infected wounds. Tell soldiers to shake out their clothing before dressing and to check their boots before putting them on. Where possible, boots should be placed off the ground or inside a waterproof bag or other container.

Use insect repellent religiously. Deet repellent lotion is recommended (NSN 6840-01-284-3982). Also available is Permethrin clothing repellent (NSN 6840-01-278-1336).

Appendix A

References

The following list of forms and publications are the most important to have available during Annual Training.

Regulations

AR 385-9: Safety Requirements for Military Lasers

AR 385-40: Accident Reporting and Records

AR 385-55: Prevention of Motor Vehicle Accidents

AR 385-62: Regulations for Firing Guided Missiles and Heavy Rockets for Training, Target Practice, and Combat

AR 385-63: Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat

AR 385-64: Ammunition and Explosives Safety Standards

AR 385-95: Aviation Accident Prevention

AR 600-55: Motor Vehicle Driver and Equipment Operator Selection, Training, Testing, and Licensing

Forms

DA Form 285: U.S. Army Accident Report

DA Form 2397: Technical Report of U.S. Army Aircraft Accident

Appendix B

Driver Training Publications

TC 21-305: Techniques and Procedures Training Circular for the Wheeled Vehicle Driver, 22 May 91

TC 21-305-1: Heavy Expanded Mobility Tactical Truck (HEMTT), 4 Dec 91

TC 21-305-2: Night Vision Goggles (NVG) Wheeled Vehicle Operator Training, 14 Nov 90

TC 21-305-3: M939 Series 5-Ton Cargo Truck Operator Training, 10 Dec 90

TC 21-305-4: High Mobility Multipurpose Wheeled Vehicle (HMMWV), 31 May 91

TC 21-305-5*: Commercial Heavy Equipment Transporter (CHET), Medium Equipment Transporter (MET), Light Equipment Transporter (LET)

TC 21-305-6*: M915, M931 Series Tractor, Semitrailer Operator Training

NOTE: Videos are available to supplement these training circulars. See the TCs for requisition information.

*To be published. Draft copies are available from Driver Training Office, U.S. Army Transportation Center, Fort Eustis, VA 23604-5407, AV 927-5156/5764 (commercial 804-878-5156/5764).

Appendix C

Range Operations

Unit commanders are responsible for complying with range regulations and SOPs. Commanders must ensure that all personnel are briefed on range procedures and safety requirements and that they wear required personal protection.

Officer in charge

An OIC must be designated for each firing exercise and/or maneuver area in accordance with AR 385-63. The OIC must be knowledgeable in the weapon system and in safe ammunition handling and use procedures. The OIC is responsible for the overall safe conduct of training and proper use of range or training complex. OIC responsibilities include the following:

- Receive a range safety briefing from the range control organization at the A.T. site.
- Ensure that all range safety personnel are thoroughly briefed and knowledgeable of their duties.
- Ensure that all range users are briefed on range safety.
- Be physically present at the range during firing.
- Determine when it is safe to fire in accordance with range control requirements.
- Obtain range control permission to open a range (commence firing, better known as "go wet").
- Ensure that adequate medical support and a means of emergency medical evacuation are available on the range.
- Ensure that ammunition and explosives are properly handled, transported, stored, and accounted for from receipt to turn-in.
- Ensure that only "firers" are issued ammunition.

Range safety officer or NCO

In addition to the OIC, a range safety officer or NCO must be designated. Assistant safety personnel may be appointed as required. Following are their responsibilities:

- Be physically present at all times during operation of the range.
- Be qualified on the weapon/system being fired.
- Ensure that weapons are properly positioned before firing.

■ Ensure that only authorized ammunition and explosives, to include proper charge, fuze, and fuze settings, are used.

■ Ensure that surface danger zones are clear of personnel before and during firing.

■ Ensure that proper hearing protection and other protective equipment is worn by all personnel.

■ Upon completion of firing, verify that all weapon systems are clear before removal from the firing area.

General safety rules

■ Unauthorized personnel are prohibited from handling or removing unexploded munitions (duds) from the range.

■ Ammunition and explosives (to included pyrotechnics) will be stored in a location that minimizes the potential for ignition, explosion, rapid burning, or sympathetic detonation.

■ Distribution of ammunition to individual crews or soldiers will occur only in areas designated for that purpose; blank and live ammunition will not be issued at the same point.

■ All ammunition will be covered to protect it from the elements and direct rays of the sun. An air circulation space between the ammunition and cover will be maintained.

■ The quantity of ammunition unpacked at the firing line will be kept to the minimum number of rounds needed for efficient firing of the exercise. Packaging material, propelling increments, and fuzes will be retained until firing is complete.

■ Units will not indiscriminately fire or dispose of ammunition to avoid returning it to a storage facility.

■ All ammunition unpacked for firing, but not fired, will be repacked in its original packing before being returned to the ammunition supply point.

■ Ammunition listed below will not be fired unless the firing vehicle is "buttoned up" and unprotected observers are within safe areas as designated by range control:

- 152mm shillelagh missile (driver's hatch only).
- 165mm combat engineer vehicle (CEV) cartridges when range to impact is less than 1,000m.

■ Certified ammunition must be used for exercises that require overhead fire of unprotected troops; i.e. certified propellant, projectile, and fuze. The ammunition listed below will not be fired over the heads of unprotected soldiers:

- All tactical tank ammunition and discarding sabot ammunition to include 25mm cartridges.
- 152mm shillelagh missiles.
- 165mm (CEV) cartridges.
- All rockets, guided missiles, and rocket-assisted projectiles (MLRS rockets excluded if fired under waiver).
- All mortar cartridges.
- Simulators and M125, M126, M127, or M195-series ground illumination projectiles (signals).
- Improved conventional munitions.
- Antipersonnel (beehive) cartridges.

■ Removal of spent brass, unfired rounds, or components of fired rounds from contaminated impact areas is prohibited.

■ Dumping of ammunition or explosives into impact areas or other unauthorized disposal areas is prohibited.

Appendix D

Accident Reporting

The "minor" accident in your unit may seem unimportant; however, added to others Armywide, it may help to identify a trend. Trend identification is essential to analyzing accidents in order to develop safety programs to protect soldiers and equipment.

The Army Safety Center needs to know about accidents that happen in your unit; your accident reporting to your chain of command is crucial to our ability to help soldiers operate safely.

Report ground accidents on the new DA Form 285, dated May 1991. A detailed instruction pamphlet is available from your host installation safety office.

Report aviation accidents by PRAM (Preliminary Report of Aircraft Mishap).

In the event that forms are not immediately available, collect the following information:

- Unit.
- Time/date of accident.
- Location of accident (coordinates/country).
- Name, rank, SSN, and MOS/job series of person(s) involved.
- On/off duty.
- Component (RA, USAR, ARNG, civilian).
- What was the victim doing?
- What were the injuries?
- What materiel/property damage occurred?
- What was estimated accident classification?

(Class A = $1,000,000 or more; Class B = $200,000 to $999,999; Class C = $10,000 to $199,999; Class D = $2,000 to $9,999)

- What happened?

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☆ U. S. Government Printing Office: 1993 - 733-268 (61346)