

Army in Europe Pamphlet 385-15

Safety

**Leader's Operational
Accident-Prevention Guide**

**Headquarters
United States Army, Europe,
and Seventh Army
United States Army Installation
Management Agency, Europe
Region Office
1 May 2003**

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Summary. This pamphlet provides—

- Accident-prevention policy for planning and executing tactical exercises and operations.
- Safety standards on—
 - Using smoke simulators, pyrotechnics, chemicals, riot-control agents, and aircraft sprays in training.
 - Speed limits for tactical and nontactical vehicles (NTVs).

***This pamphlet supersedes AE Pamphlet 385-15, 21 November 2002.**

***Change 1, dated 1 August 2003, has been incorporated in this edition.**

This pamphlet is available at <https://www.aeaim.hqusareur.army.mil/library/home.htm>.

- Uniform requirements for armored vehicle crews, tactical vehicles, and convoys.

- Deployment-operation requirements.

Summary of Change. This revision includes updated speed limits for NTVs (table 1), revised hazardous-materials transportation information (AE Reg 55-4), and updates to the Rail Safety Program.

Applicability. This pamphlet applies to leaders in U.S. Army elements planning or conducting tactical exercise and operations in USAREUR areas of operation.

Forms. AE and higher-level forms are available through the Army in Europe Publishing System (AEPUBS).

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Suggested Improvements. The proponent of this pamphlet is the USAREUR G1 (AEAGA-S, DSN 370-8084/8124). Users may suggest improvements to this pamphlet by sending DA Form 2028 to the USAREUR G1 (AEAGA-S), Unit 29351, APO AE 09014-9351.

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SECTION I INTRODUCTION

1. PURPOSE

This pamphlet provides operational risk-management and accident-prevention guidance and should be used with the following when appropriate:

- a. AE Pamphlet 385-15-2, Commander's Rail Operations Checklist and Risk Assessment.
- b. UP 385-15-1, Commander's Convoy Checklist and Risk Assessment.
- c. UP 385-15-3, Port Operations Checklist and Risk Assessment.
- d. UP 385-15-4, Sea and Supercargo Operations Checklist and Risk Assessment.

2. REFERENCES

Appendix A lists references.

3. EXPLANATION OF ABBREVIATIONS AND TERMS

The glossary defines abbreviations and terms.

4. RESPONSIBILITIES

a. Commanders will—

(1) Complete pre-mission risk assessments and follow risk-management principles (sec II).

(2) Develop a crew-endurance policy that supports mission accomplishment and conserves operational resources.

(3) Review safety requirements in this pamphlet when planning and executing operations.

(4) Coordinate safety measures not in this pamphlet with unit safety officers.

(5) Ensure safety measures are followed.

(6) Review reports of accidents.

(7) Develop policy to prevent accidents and reduce risk.

(8) Develop severe-weather warning plans.

(9) Develop preaccident plans for ground and aviation operations.

(10) Integrate risk management results into mission briefings.

(11) Conduct mission briefings before every mission.

b. HQ USAREUR/7A staff principals will ensure operation plans they receive from units include the risk-reduction measures in this pamphlet.

SECTION II RISK MANAGEMENT

5. RISK-MANAGEMENT PROCESS

FM 100-14 explains the principles, procedures, and responsibilities to successfully apply the risk-management process to conserve combat power and resources. The three principals for implementing the risk-management process are:

a. Integrate risk management into mission planning, preparation, and execution.

b. Make risk decisions at the appropriate level in the chain of command.

c. Accept no unnecessary risk.

(1) The commander, leader, or individual responsible for executing the mission or task may accept medium- and low-risk levels (app B).

(2) Commanders responsible for a mission may accept low and medium levels of residual risk (glossary). High levels of residual risk must be referred to at least the battalion or brigade level for a decision. Extremely high levels of residual risk must be referred to the first general officer in the chain of command for decision.

6. RISK MANAGEMENT

DA Pamphlet 385-1, chapter 3, explains how risk management is carried out as part of unit operations and training. Leaders will—

a. Identify Hazards. Identifying hazards and risks involves looking closely at each phase of training or operations. Leaders will include safety risk management in the unit mission-essential task list.

b. Assess Hazards. Leaders will consider the likelihood of an incident and the degree to which injury or equipment damage or mission degradation is possible. Appendix B includes a hazard-probability table.

c. Develop Controls and Make Risk Decisions. When risk elimination is not possible, leaders will control risks without sacrificing essential-mission requirements.

(1) Risk controls may include establishing, modifying, or using—

(a) New or revised task standards.

(b) Operational procedures and parameters.

(c) Training requirements.

(d) Maintenance standards.

(2) Making a risk decision may include the following steps:

(a) Selecting controls.

(b) Trading off mission elements against risk controls.

(c) Making a final decision as to whether or not controls are good enough to make a risk acceptable, considering mission benefits.

d. Implement Controls. Leaders will integrate procedures for controlling risk into plans, orders, standing operating procedures (SOPs), preliminary training, and other media to ensure the control procedures are used during operations. The chain of command will be involved in implementing controls. Leaders will communicate risk assessments and controls to the next higher level of command and to soldiers through mission briefs.

e. Supervise Operations. Leaders will supervise operations and evaluate operational results (including the effectiveness of risk-management controls).

SECTION III WHEELED AND TRACKED VEHICLES

7. GENERAL REQUIREMENTS

Commanders will ensure—

a. Army motor-vehicle operators successfully complete a 2-hour orientation, the International Road-Sign Test, and a 100-question written test. Army motor-vehicle operators will be selected, trained, tested, and licensed to operate vehicles (including tracked vehicles) according to the following publications:

(1) AE Regulation 600-55.

(2) The technical manuals (TMs) for the specific vehicles they are operating.

(3) UP 190-34 or other appropriate country-specific guidance.

b. Drivers of wheeled vehicles carrying hazardous materials have been qualified according to AE Regulation 55-4.

c. Convoy commanders or other senior persons properly and immediately place emergency-warning devices and take other appropriate measures to warn approaching vehicles of a vehicle breakdown. All vehicles are required to carry a reflective vest and warning triangle.

d. Vehicles participating in exercises and operations have received appropriate mechanical inspections. For example, before tracked vehicles

are deployed or operated on public roads, the track pad connecting pins of each tracked vehicle must be checked and replaced if necessary.

e. Safety-related deficiencies on vehicles have been corrected. Vehicles will be classified “not mission capable (NMC) for safety” for the following reasons:

- (1) Seatbelts have been removed or are not operational.
- (2) Headlights, brake lights, or turn signals are nonoperational.
- (3) Eye protection for vehicles without windshields is missing.
- (4) Safety chains or similar devices for trailers are missing.
- (5) Warning triangles, first-aid kits, reflective vest, or fire extinguisher is missing.
- (6) Rotating or flashing blue lights for emergency vehicles are missing.
- (7) Chockblocks are missing.
- (8) Delineator plates are not installed.
- (9) When operating a convoy, required rotating amber warning lights (RAWLS) or signs are missing or not working properly.

f. Vehicle inspectors pay particular attention to—

- (1) Brakes.
- (2) Directional signals.
- (3) Exhaust system.
- (4) First-aid kit.
- (5) Fuel system.
- (6) Headlights.
- (7) Heating system switch position (before operations).
- (8) Reflectors.

- (9) Seatbelts (if installed).
- (10) Taillights.
- (11) Tires.
- (12) Trailer hitch and electrical and airhose connections, as applicable.
- (13) Warning triangles.
- (14) Windshield wipers.

g. Built-up vehicles meet the standards in UR 385-55, appendix G.

h. Ground guides are used when backing wheeled and tracked vehicles. UR 385-55 provides ground-guiding standards. Ground guides will not stand between the vehicle being guided and another object. An inadvertent engine surge or momentary loss of vehicle control could cause injury or death. Arm-and-hand signals prescribed in FM 21-60 must be used. The vehicle driver will stop the vehicle immediately if—

- (1) He or she loses sight of the ground guide.
- (2) The ground guide is standing dangerously between the vehicle and another object.

i. Wheeled vehicle drivers follow procedures for determining clearance when ground guides are not available. In emergencies, when a ground guide is not available, wheeled-vehicle drivers will—

- (1) Dismount.
- (2) Walk completely around the vehicle to verify clearance.
- (3) Select a ground-reference point that can be seen from the cab of the vehicle.
- (4) Mount the vehicle, ensuring the ground-reference point can be seen from the cab of the vehicle.
- (5) Sound the horn.
- (6) Back to the preselected ground-reference point.

(7) Repeat the process as necessary until the vehicle is in the desired position.

j. Procedures are followed for ground-guiding engineer vehicles operating at supervised or controlled-access construction sites. Before starting vehicle engines, drivers of graders, bulldozers, and other engineer vehicles will—

(1) Walk around the vehicle to ensure the area is free of obstructions. Ground guides are not necessary to back engineer equipment operating at supervised or controlled-access construction sites.

(2) Sound the vehicle horn before backing or ensure the automatic backup alarm is operational.

k. Drivers of engineer vehicles operating outside supervised or controlled-access construction sites use the standards and number of ground guides required for vehicle types in UR 385-55, paragraph 3-19.

l. Wheeled and tracked vehicles, trailers, and towed equipment are marked at the rear with retroreflective red and yellow delineator plates, according to UR 385-55, appendix H.

m. Exterior radio antennas have been tied down to a height of not more than 13 feet and at least 8 feet from the ground before movement. Antenna tips (national stock number (NSN) 5800-00-437-2363) must be installed. Antennas must be secured under the clip and clipped from below in the quick-release position.

n. Soldiers do not ride in cargo areas when traveling on autobahns or highways, or at any time when hazardous material is being transported. Personnel will not ride on cargo in cargo areas of wheeled vehicles. Soldiers riding in cargo areas will sit on seating platforms or individual seats. Soldiers being transported in cabins or cargo areas of wheeled vehicles will wear seatbelts if installed. Soldiers will use vehicle seatbelts even when wearing load-bearing equipment (LBE). Soldiers will remain seated when the vehicle is moving. The senior occupant is responsible for ensuring compliance.

o. Wheeled-vehicle tailgates are locked in the up position. If installed, restraining straps extending across rear cargo beds must be secured before vehicle movement.

p. Army wheeled vehicles are equipped with and drivers use chockblock pairs when vehicles are parked on inclines or when maintenance is performed. If chockblock pairs have not been issued, they may be made locally using 8-inch wood stock cut at 45-degree angles. Chockblocks must be used as pairs, placing one block in front of and one block behind the tire being chocked.

q. Drivers of wheeled vehicles, unless under real-world threat, do not wear mission-oriented protective posture (MOPP) protective masks or night vision goggles on public roads and access roads that lead to and from training areas.

r. Broken-down vehicles are moved as far as possible to the side of the roadway and marked with warning triangles or other warning devices as required by host-nation (HN) laws. Personnel may be posted as warning guides only when the severity of the situation warrants, and after full consideration for their safety. Military personnel have no authority to direct civilian traffic on public highways. Warning guides will wear reflective vests and warn drivers of traffic accidents, oversized and broken-down vehicles, and other hazards on highways. HN police must be called for assistance when the situation poses a risk to other traffic or when hazardous materials are spilled. Many highways are equipped with emergency telephones. Black arrows on roadside distance posts show the direction of the nearest telephone. Under an exemption issued by the German Government, disabled U.S. Forces vehicles may be towed on autobahns beyond the next point of exit. A copy of the exception permit must be carried on the towing vehicle. A copy of the exception may be obtained from the 1st Transportation Movement Control Agency through the local branch movement control team.

s. Maximum speeds for normal driving conditions (table 1) are observed. Abbreviations used in the table are explained in the glossary. Speeds must be adapted for weather, traffic, and road conditions.

t. Posted speed limits are not exceeded.

u. Procedures are established to control vehicle operations under different road conditions according to UR 385-55, appendix I.

8. SELECTING AND TRAINING DRIVERS

Commanders will ensure drivers for single-vehicle missions (nonconvoy) are selected carefully. Commanders will consider driver maturity, experience, and fatigue. Senior vehicle occupants must be briefed and understand their duties and responsibilities. UR 385-55, appendix B, and this pamphlet, paragraph 19, explain senior occupant responsibilities.

Table 1 Maximum Speeds for Normal Driving Conditions			
	Cities	Autobahns/ Highways	Other/ Secondary Roads
SPEED LIMITS FOR NONTACTICAL VEHICLES (mph/kph)			
NTVs under 7,000 lbs GVW (for example, minivans, cargo trucks, carryalls, panel trucks, sedans)	31/50	74/120	60/100
EXCEPTIONS			
Buses or NTVs carrying 12 or more passengers seated	31/50	50/80	50/80
Buses or NTVs carrying 12 or more passengers standing	31/50	Not Authorized	Not Authorized
NTVs over 7,000 lbs GVW (for example, semitrailers, stake trucks, truck tractors, water tankers, wreckers)	31/50	50/80	37/60
Any NTVs pulling any type of trailer	31/50	50/80	50/80
SPEED LIMITS FOR TACTICAL VEHICLES (mph/kph)			
March columns (excluding vehicles that might further restrict speed)	31/50	50/80	50/80
Oversized, overweight, and towed vehicles	31/50	50/80	37/60
Trucks, ¼- to 1¼-ton (with or without trailers, including HMMWVs and CUCVs)	31/50	50/80	37/60
Trucks and truck tractors, 1½-ton and larger (with or without trailers)	25/40	50/80	37/60
Trucks transporting ammunition, explosives, or dangerous cargo	25/40	50/80	37/60
M939 family of vehicles that have not had the ABS retrofit MWO completed	25/40	40/65	35/57
<p>NOTES: 1. The above speed limits will be observed unless a lower speed limit is posted; prescribed by the applicable operators technical manual for the vehicle; or weather, traffic, or road conditions warrant a lower speed.</p> <p>2. For vehicles carrying hazardous cargo—</p> <p style="padding-left: 20px;">a. If visibility is less than 50 meters, the driver will stop at the nearest parking area until visibility improves.</p> <p style="padding-left: 20px;">b. If a vehicle weighing more than 3.5 tons and carrying hazardous cargo is traveling faster than 31 mph/50 kph, it will maintain a distance of at least 50 meters from the vehicle in front.</p>			

9. CREW ENDURANCE AND SAFE DRIVING

a. Drivers will not be assigned to drive an Army wheeled or tracked vehicle for more than 10 continuous hours (AR 385-55). Commanders should restrict driving periods when adverse road or weather conditions exist. Other factors, such as the amount of driver training, the type of vehicle, and the availability of assistant drivers, also should be considered before mission execution. Unit commanders will develop, implement, and enforce policy on unit crew-endurance and assistant-driver-scheduling using guidance in UR 385-55. Unit policy must include the following requirements:

(1) A combined duty period will not exceed 12 hours in a 24-hour period without at least 8 consecutive hours of rest.

(2) A qualified assistant driver will be assigned to a vehicle when more than 10 hours are needed to complete operations.

b. Drivers will—

(1) Take 15-minute breaks after every 2 to 3 hours of driving or after driving 100 to 150 miles (160 to 240 kilometers), whichever comes first.

(2) Inspect their vehicles and ensure equipment and cargo are secure during breaks.

(3) Take 1-hour meal breaks.

(4) Not use headphones or earphones while driving Army motor vehicles. The driver and passengers will, however, wear hearing-protection devices when required (DA Pam 40-501).

(5) Not consume intoxicating beverages within 8 hours before scheduled duty or during normal duty.

(6) Not eat, drink, or smoke in an Army vehicle while it is moving.

c. Commanders may determine that additional rest periods are necessary when—

(1) Drivers may encounter unusually poor weather or road conditions.

(2) Hazardous materials are being transported.

(3) Drivers will be involved in prolonged or unusually difficult exercises or operations.

10. OPERATING WHEELED VEHICLES

Commanders will ensure—

a. Drivers operating vehicles carrying hazardous cargo (including such things as gas cylinders, flammable liquids, fuel or explosives) are briefed on transportation documents according to AE Regulation 55-4. Drivers will have a valid *Accord Européen relatif au Transport International des Marchandises dangereuses par Route* (European Agreement Concerning the Transportation of Hazardous Goods by Highway) (*ADR*) certificate and a vehicle license. Drivers will carry the required shipping documents and accident information sheets. These forms will be given to drivers and maintained as part of the vehicle-movement package. Drivers in convoys and individual vehicles transporting hazardous material will use the accident information sheets in an emergency.

b. Headlights, taillights, reflectors, and reflective markings are wiped clean at each stop.

c. Controls are established to prohibit smoking within 50 feet of vehicles carrying explosives or flammable material.

d. Gasoline cans are equipped with serviceable gaskets and are properly marked.

e. Trailers are towed with safety chains attached to the towing vehicle. Trailer signal and brake lights must work. Drivers will attach 2½- and 5-ton trailer airhoses according to the applicable operators manual.

f. Procedures for broken-down vehicles are followed (para 7r).

g. Each vehicle is equipped with a reflective vest and warning triangles.

h. Drivers and passengers wear Kevlar helmets while riding in tactical vehicles.

i. Wheeled vehicles have wheel chains on board from 1 November through 30 April. Chains must be placed on wheels according to the appropriate vehicle operators manual when—

(1) Road conditions are amber because of snow or ice.

(2) Movement-control or range-control authorities advise that chains be used.

j. Vehicles transporting dangerous goods properly display orange rectangular plates and diamond placards as prescribed in AE Regulation 55-4.

k. All vehicles transporting hazardous materials must have a valid transport document and cargo accident information sheets in the required languages as prescribed by AE Regulation 55-4.

11. OPERATING TRACKED VEHICLES

a. General. Commanders will ensure tracked vehicles are escorted and marked according to the requirements of UR 55-1. Soldiers will not be transported on the top or on the sides of tracked vehicles. Soldiers will sit in crewmember compartments, use available seatbelts, and wear Kevlar or crewmember helmets (if applicable). The escort vehicle—

(1) Will follow tracked vehicles by 100 meters on high-speed roads (autobahns/highways).

(2) Will lead tracked vehicles by 100 meters on secondary roads.

(3) May be a single vehicle with a RAWL if the vehicle being escorted has a functional RAWL (UR 55-1).

(4) Must be marked at the rear with retroreflective red and yellow delineator plates.

b. Ground-Guiding Tracked Vehicles. Two ground guides are required to guide tracked vehicles backward and forward. If only one ground guide is available, a tracked vehicle may be guided only forward. UR 385-55 provides ground-guiding standards.

c. Engineer Vehicles Operating at Supervised or Controlled-Access Construction Sites. Before starting vehicle engines, drivers of graders, bulldozers, and other engineer vehicles will walk around the vehicles to ensure the area is free of obstructions. Ground guides are not required to back engineer vehicles operating at supervised or controlled-access construction sites. Drivers of engineer vehicles, however, will sound vehicle horns before backing. Engineer vehicles operating outside supervised or controlled-access construction sites will use the standards and numbers of ground guides prescribed by UR 385-55.

d. Safety Requirements. Commanders will ensure—

(1) Drivers of tracked vehicles do not wear protective masks during operations on public roads except under real-world threat.

(2) Drivers use parking lights and RAWLs when tracked vehicles are stopped on or near public highways during dusk, dawn, or darkness.

(3) Personnel warn approaching motorists of a stopped vehicle by turning on the vehicle's warning lights.

(4) Tracked vehicle commanders use extreme caution and yield the right-of-way when making left turns on public roads.

(5) Disabled tracked vehicles being towed are escorted and lit properly.

(6) Highway warning devices, including one warning triangle, are issued to every vehicle and are used according to HN requirements.

(7) Tracked vehicles are not started by towing. Slave cables with threaded male-to-female couplings must be used. Bare cable leads will not be used. Only vehicles parked side by side may be joined with slave cables. Vehicles parked front-to-front will not be joined with slave cables.

(8) Equipment transported in vehicles is secured.

(9) Leaders enforce the wearing of appropriate hearing protection devices and protective headgear. Decals that state, "hearing protection required" must be placed in the crew compartments of tracked vehicles.

(10) Tank commanders alert the driver and crew and ensure they are out of the way before moving a gun turret.

(11) Observation personnel in tracked vehicles stay low (not higher than uniform-nametag level on the rim of the hatch cover).

(12) Tracked-vehicle ramps are not lowered until the rear of the vehicle is clear.

(13) Safety latches are installed on tracked vehicle hatches (excluding the M548, M667, and M578).

(14) Crewmembers—

- (a) Wear combat-vehicle crewman helmets when operating tracked vehicles.
- (b) Wear combat-vehicle crewman uniform systems during operations.
- (c) Insert the safety pin when a vehicle is driven with the hatch open.
- (d) Shake closed hatch covers to ensure they are locked.
- (e) Do not grip the edge or rim of an open hatch.
- (f) Practice and become knowledgeable on emergency rollover and fire evacuation drills at least every 3 months.

(15) Personnel are briefed and trained on emergency procedures to be taken if a tracked vehicle overturns (for example, crewmembers will not jump from the vehicle, but quickly drop inside and take a secure hold).

(16) Personnel enter armored personnel carriers only through the rear door or ramp. Climbing on tracked vehicles will be restricted to mission-essential activities.

(17) Heaters in tracked vehicles have no leaks in the heater or exhaust ducts. At least one hatch must be open to prevent carbon monoxide buildup.

(18) Operators are at the controls when the engine of a tracked vehicle is running.

(19) Every vehicle is equipped with a reflective vest and warning triangle.

12. TOWING TRACKED VEHICLES

Commanders will ensure—

- a. Vehicles are not towed if they can be repaired on site.
- b. The decision to tow a vehicle is made by one of the following:
 - (1) An officer.

(2) A senior noncommissioned officer (NCO) (sergeant first class and above).

(3) A qualified unit motor sergeant.

c. Towed vehicles have the final drive-input shafts disconnected to prevent further damage. Only approved tow bars will be used. Cables or chains will not be used for towing when final drives are disconnected.

d. Personnel do not ride on or in a tracked vehicle being towed.

SECTION IV MOTOR VEHICLE OPERATIONS WITH NIGHT VISION DEVICES

13. GENERAL

This section provides requirements for the use of night vision devices (NVDs) by motor vehicle operators (TC 21-305-2).

14. RESPONSIBILITIES

a. Commanders will manage NVD training programs according to AR 600-55.

b. NVD instructors will implement their commander's program, conduct training, administer road tests, and keep the commander informed of the overall status of the unit NVD training program.

15. TRAINING

a. Qualification Training.

(1) Qualification training must include both academic and night-driving tasks. A qualified NVD instructor will supervise the training.

(2) During training, the NVD operator must pass a written test and demonstrate proficiency in using NVDs to a qualified instructor.

b. Qualification Requirements. NVD operators will—

(1) Be licensed in and knowledgeable of the vehicle in which they will receive NVD training.

(2) Complete the academic and driving requirements in AR 600-55, appendix I.

(3) Satisfactorily complete an NVD driving evaluation given by a qualified NVD instructor.

c. Refresher Training. Motor vehicle operators who have not completed an NVD driving task or mission in the past 6 months must receive refresher training to keep their NVD proficiency qualification.

d. NVD Unit Instructor.

(1) The NVD unit instructor will—

(a) Be NVD-qualified.

(b) Be licensed on the applicable vehicle.

(c) Consistently demonstrate maturity and driver-training skills and abilities.

(2) The commander will assess the unit instructor's ability to provide adequate instruction.

e. NVD Accident Reporting. Reports of Army motor vehicle accidents involving the use of image-intensification devices must include weather conditions at the time of the accident on DA Form 285, section C, or DA Form 285-AB-R, block 37b. If known, the report must include the percentage of moon illumination at the time of the accident.

**SECTION V
CONVOY OPERATIONS—WHEELED AND TRACKED VEHICLES**

16. PREOPERATION REQUIREMENTS

Before convoy operations, commanders will review the operating standards in UR 55-1, conduct a risk assessment, and brief personnel on the mission. All convoys (three or more vehicles) must have the required convoy safety equipment (including convoy signs and RAWLS). Use of convoy flags is a movement-credit requirement, not a safety requirement. Commanders of convoy serials and march units will—

a. Identify hazards along the march route. Commanders should conduct a physical reconnaissance of the march route when possible.

b. Conduct a mission brief, including catch-up and breakdown procedures.

c. Prepare and distribute convoy stripmaps to each vehicle commander or driver during the premission briefing attended by vehicle crewmembers.

d. Under normal circumstances, limit march units to 25 vehicles and march serials to not more than 5 march units.

e. Ensure at least 5 minutes are allowed between march units and at least 15 minutes are allowed between march serials on the open road.

17. REQUIREMENTS DURING OPERATIONS

a. General. Convoy commanders will—

(1) Ensure the principles of march discipline are observed. (FM 55-30, chap 5).

(2) Plan for and provide adequate rest periods (para 9b(1)).

(3) Plan for HN police assistance to regulate traffic.

(4) Instruct drivers to obey police instructions.

(5) Instruct drivers to slow down and provide adequate space for passing vehicles to return to the traffic lane.

(6) Ensure lead vehicles and trail escort vehicles (TEVs) are assigned (UR 55-1).

(7) Ensure that communications are established at least between the lead escort vehicle and the TEV.

(8) Ensure all vehicles have headlights on as permitted by HN laws.

b. Space Between Vehicles.

(1) The space between vehicles in an open-column march unit must be at least—

(a) One hundred meters or a 6-second interval on autobahns or highways.

(b) Fifty meters or a 4-second interval on secondary roads (excluding congested areas).

(2) March units will reduce speed and vehicle intervals when approaching congested areas and will proceed under closed march column. The space between vehicles may be reduced to 25 meters or to a 2-second interval, whichever is greater, for movement through congested areas. Units will resume prescribed distances ((1) above) after leaving a congested area.

(3) Convoy commanders—

(a) May order the space between vehicles reduced to permit drivers to see the vehicles in front of them in bad weather or when road conditions are poor.

(b) Will not reduce the space between vehicles when it would prevent civilian vehicles from safely passing convoys.

c. Reflective Clothing. Guide personnel, road guards, wrecker operators, and other personnel will use reflective clothing when walking on or near public roads. Sleevebands (NSN 8564-00-177-4976) and safety vests (NSN 8415-00-177-4974) may be worn when walking on or near public roads.

d. Stopping. Military drivers will—

(1) Stop vehicles off roads and clear of intersections.

(2) Ensure spaces in halted convoys are closed.

(3) Use caution when resuming movement.

(4) Not flash or otherwise signal civilian drivers that it is safe to pass.

e. Warning Approaching Traffic. Personnel in trailing vehicles will post traffic-warning devices according to HN law when the vehicles stop on the roadway. After full consideration for personal safety and when the severity of the situation warrants, a warning guide wearing proper reflective clothing may also be posted to warn approaching traffic when the convoy stops.

f. Convoys Moving Through Intersections.

(1) Drivers in military convoys will—

(a) Follow right-of-way rules for moving through intersections.

(b) Not force the right-of-way on other drivers. Military convoys have the right-of-way only when other drivers yield.

(c) Be aware that other drivers are not required to stop when a military convoy is moving through an intersection that has a traffic light.

(2) Commanders will ensure convoys stop when other traffic does not yield the right-of-way.

(3) In the absence of local HN police, military personnel will warn (not regulate or police) approaching civilian traffic of a convoy passing through an intersection. Motor vehicles may be used to warn other motorists, but must not block traffic lanes.

(4) Military personnel will wear reflective clothing to ensure they are visible and recognizable as warning guides. They will not force drivers to stop.

18. IDENTIFYING MARCH UNITS

a. Convoy commanders will—

(1) Identify each convoy and oversized or overweight vehicle as prescribed by UR 55-1.

(2) Use leading and trailing escort vehicles.

(3) Ensure the lead vehicle of each march unit—

(a) Displays one or two RAWLs. Special light rules for the Netherlands are explained in (8) below.

(b) Has a sign (black letters on nonglare white background) with the words “Convoy Follows” in English and the languages of the nations traveled through, as follows:

1. *”Kolonne Folgt”* (German).

2. *”Colonne Suit”* (French).

3. *”Colonne Folgt”* (Dutch).

4. *”Inizio Colonna”* (Italian).

(4) Ensure the last vehicle of each march unit displays a sign with black letters on a nonglare white background. The size of the sign will depend on the size and shape of the rear of the vehicle. The sign must not obscure taillights, directional signals, or other vehicle markings. Each march unit will have its own TEV, because of the distance covered during the operations. TEVs will not transport hazardous material (such as ammunition, explosives, fuel, gas cylinders) as cargo, or carry personnel in the cargo area. The sign will state "Convoy Ahead" in English and in the languages of the nations traveled through, as follows:

- (a) "*Kolonne Voraus*" (German).
- (b) "*Colonne en Tête*" (French).
- (c) "*Colonne Vooraan*" (Dutch).
- (d) "*Fine Colonna*" (Italian).

(5) Determine which vehicles, in addition to the lead, middle, and trail vehicles, should turn on RAWLs based on visibility, weather conditions, and convoy spacing.

(6) Ensure single-vehicle operators do not operate RAWLs unless the vehicles meet the oversize, overweight, or slow-moving criteria in UR 55-1.

(7) Ensure tracked vehicles operating alone (with required escort) or in a convoy on public roads are equipped with RAWLs and are marked on the outside corners with reflective markings as specified in UR 55-1 and UR 385-55.

(8) Identify convoys operating in or through the Netherlands as follows:

(a) The lead vehicle must have one blue transparent cover on the right headlight. Headlights must be on low beam.

(b) The last vehicle must have one green transparent cover over the right headlight. Headlights must be on low beam.

(c) Other vehicles must have one blue transparent cover on the right headlight. Headlights must be on low beam.

b. Tracked vehicle convoy commanders will ensure—

(1) RAWLs are operating on at least the lead, middle, and trail escort vehicles.

(2) Each vehicle is equipped with a RAWL, which must be turned on if a vehicle falls out of the convoy. In the Netherlands, RAWLs will be used only when vehicles or loads are wider than 2.5 meters (8 feet, 3 inches).

c. March unit commanders will display a black and white flag (NSN 8345-00-543-6911) on the left side of the vehicle.

19. SENIOR OCCUPANT RESPONSIBILITIES

The senior occupant of an Army motor vehicle is the person in the vehicle (operator or passenger) with the highest rank. The senior occupant will—

a. Be a responsible person who has exhibited mature judgment.

b. Ensure an assistant driver is assigned when required.

c. Verify drivers are licensed and qualified to operate the vehicles dispatched.

d. Verify drivers have had at least 8 hours continuous rest before driving when combined duty (non-driving and driving) periods exceed 12 hours in any 24-hour period.

e. Verify drivers have not consumed alcoholic beverages during the 8 hours before scheduled duty or during their normal duty shift.

f. Ensure drivers do not operate an Army motor vehicle for more than 4 hours under adverse conditions or 10 hours under normal conditions in 1 day. Driving for more than 8 hours (time for rest breaks and meals excluded) is authorized only if approved by the battalion commander in writing.

g. Ensure drivers take 15-minute rest breaks every 2 to 3 hours of driving or after driving 100 to 150 miles (160 to 240 kilometers), whichever comes first. During these breaks, drivers will inspect their vehicles and check that equipment and cargo are secure. Drivers also will take 1-hour meal breaks.

h. Provide additional rest periods when bad weather, hazardous cargo, or difficult operations are involved.

- i. Ensure that drivers who appear fatigued or physically, emotionally, or mentally impaired do not operate a vehicle.
- j. Ensure vehicle occupants wear seatbelts, if installed, while the vehicle is in motion.
- k. Ensure the authorized seating capacity of the vehicle is not exceeded.
- l. Ensure the driver does not eat, drink, or smoke while driving.
- m. Ensure the driver does not wear headphones or earphones while driving. This does not include hearing protection when required.
- n. Help the driver recognize unsafe mechanical conditions of the vehicle.
- o. Help the driver when backing and when performing other difficult maneuvers when an assistant driver is not available.
- p. Ensure the driver does not interrupt the flow of civilian traffic by making sudden halts, unauthorized U-turns, or other driving maneuvers on the road.
- q. Ensure the driver complies with road signs and speed limits according to road conditions. Vehicle headlights must be on when permitted by HN laws.
- r. Ensure highway warning devices are properly displayed when the vehicle stops on or beside the traveled portion of the road. Local authorities must be notified if the situation puts other drivers at risk or if hazardous materials are spilled.
- s. Conduct a risk assessment of the situation before posting a warning guide to warn approaching traffic when the vehicle is disabled or stopped in a location that obstructs traffic.
- t. Ensure the driver maintains a safe interval between vehicles.
- u. Ensure tire chains are used when needed.
- v. Ensure the driver's vision is not obstructed by ice, snow, dirt, personal radios, or other items in the vehicle.
- w. Enforce antenna tie-down requirements.

- x. Comply with convoy march discipline when vehicles have stopped.
 - y. Ensure that vehicle safety items are serviceable and used as required.
 - z. Ensure that the driver complies with traffic laws and unit SOPs.
- aa. Be knowledgeable and execute provisions of UR 190-1, paragraph 4-7, or other country-specific guidance in case of an accident.
- ab. Be licensed to operate the vehicle if driving is deemed necessary. Additionally, if the vehicle is transporting hazardous materials and driving is deemed necessary, the senior occupant must also have an *ADR* certificate.

SECTION VI TACTICAL OVERWATER OPERATIONS

20. STANDARDS

UR 385-4 provides tactical overwater operations safety standards for shallow-water fording, amphibious-vehicle swimming, rafting and bridging, and assault-boat operations.

21. PLANNING

Planning is critical to the success of overwater operations. Each commander will have a written plan specific to the unit and operations before beginning tactical overwater operations.

22. RISK ANALYSIS

Mission planners will prepare risk analyses of overwater operations. When safety standards in UR 385-4 must be modified, commanders will request approval from the chain of command up to the division or equivalent level.

23. EMERGENCY SUPPORT AND UNIFORM STANDARDS

UR 385-4 (app A) and table 2 provide emergency support and uniform standards. The glossary defines abbreviations used in table 2.

SECTION VII AVIATION-ACCIDENT PREVENTION

24. GENERAL

Commanders will ensure—

- a. Flight altitude restrictions are published for each operation.
- b. Appropriate fire extinguishers are available for limited-use helicopter landing sites (UR 95-1).
- c. Establish a preaccident plan and rehearse it at least every 3 months.

Table 2 Summary of Tactical Water Operations Emergency Support and Uniform Standards									
Type Operation	Type of Personal Flotation Device	Life Guards	Safety Boat	Emergency Medical Lifesaver	Ambulance and Driver	Coordinate Air MEDEVAC	Uniform (note 1)		
							Equipment/Weapons	Uniform (note 1)	Equipment/Weapons
Shallow-water fording	opt (note 2)	1	opt	none	none	opt	Full	No restrictions	No restrictions
Amphibious-vehicle operations (vehicle commander and driver)	German type I or U.S. Type V	2	1	2	yes	yes	Minimum, as determined by commander. Helmet on.	Store LBE, overshoes, weapons, and protective mask in their cases.	Store LBE, overshoes, weapons, and protective mask in their cases.
Amphibious-vehicle operations (other crewmembers on vehicle)	German type I or U.S. Type V	2	1	2	yes	yes	Minimum, as determined by commander. Helmet on.	Store LBE, overshoes, and packs. Carry weapons at port arms.	Store LBE, overshoes, and packs. Carry weapons at port arms.
Assault-boat operations (rough rivers)	I	1	1	2	yes	yes	Wear LBE. Protective mask in its case. Helmet on.	Store overshoes and packs. Store or carry weapons at port arms.	Store overshoes and packs. Store or carry weapons at port arms.
Assault-boat operations (calm lakes)	V	1	1	2	yes	yes	Minimum, as determined by commander. Helmet on.	Store LBE, packs, and protective masks in their cases. Store or carry weapons at port arms.	Store LBE, packs, and protective masks in their cases. Store or carry weapons at port arms.
Raft or bridge construction operations by combat engineers	I	opt	opt	opt	opt	opt	Wear LBE. Protective mask in its case. Helmet on.	Store overshoes, packs, and weapons during construction.	Store overshoes, packs, and weapons during construction.
Raft or bridge construction operations by combat engineers	V	1	2-bridge 1-raft	2	yes	yes	Minimum, as determined by commander. Helmet on.	Store LBE, packs, overshoes, weapons, and protective mask in their cases.	Store LBE, packs, overshoes, weapons, and protective mask in their cases.
Soldiers crossing aluminum foot bridge	opt	opt	opt	opt	opt	opt	Full	No restrictions.	No restrictions.
Soldiers crossing rafts or bridges on foot before vehicle test (note 3)	I	1	2	2	yes	yes	Minimum, as determined by commander. Helmet on.	No restrictions.	No restrictions.
Soldiers crossing rafts or bridges on foot after vehicle test (note 3)	V	opt	opt	opt	opt	opt	Full	No restrictions.	No restrictions.
Crew in or on vehicles crossing on rafts or bridges participating in vehicle test (note 3)	V	1	1	2	yes	yes	Minimum, as determined by commander. Helmet on.	Store LBE and protective masks in their cases and packs. Store or carry weapons at port arms.	Store LBE and protective masks in their cases and packs. Store or carry weapons at port arms.
Crew in or on vehicles crossing on rafts or bridges after vehicle test	opt	opt	opt	opt	opt	opt	Full	No restrictions.	No restrictions.

NOTES: 1. In training, weak swimmers or nonswimmers will be identified by affixing a white armband to the right sleeve of the soldier's outer garment.

2. The use of additional support equipment is optional based on the risk analysis.

3. On completing bridge construction, engineers will test the bridge or raft. The testing will be done by driving vehicles of varying weight classes across the bridge to ensure stability and safety.

4. Vehicles used for this testing will be up to the maximum class expected to use the bridge. After a bridge has been tested, soldiers will not be required to dismount vehicles when crossing a bridge.

5. Soldiers may cross bridges and rafts on foot without personal flotation devices after structures have been tested.

25. OPERATIONS IN AND AROUND AIRCRAFT

Commanders will brief supported units on the following precautions for working around aircraft:

a. Only “tape” antennas will be installed on PRC-77 or other radios when soldiers are close to Army aircraft. Using “whip” antennas around aircraft is prohibited because an antenna striking a spinning rotor system may damage the main rotor system.

b. Personnel will—

(1) Approach and leave helicopters at a “crouch” (at a 45- to 90-degree angle from the front of the helicopter) in view of the crew.

(2) Not approach or leave on the uphill side of operating helicopters.

(3) Approach a CH-47 from the side or rear, in view of the crew.

(4) Not walk between, under, or close to helicopter rotors unless cleared by a crewmember.

(5) Tie down vehicle radio antennas when near aircraft.

(6) Not chamber rounds in weapons when in aircraft.

(7) Use hearing protection in and around aircraft operations.

(8) Not smoke in or within 50 feet of Army aircraft.

(9) Observe the following when ground-guiding aircraft:

(a) When directing aircraft movements, use the appropriate arm-and-hand (marshaling) signals in FM 21-60.

(b) Ground guides will wear hearing and eye protection when guiding fixed- and rotary-wing aircraft.

(c) At night, ground guides will signal with lighted batons (wands) in each hand. The intensity of these lights will vary depending on whether the aircrew is aided or unaided. Signals given with wands must be identical to daytime arm-and-hand signals unless stated otherwise in FM 21-60. Wands should remain lighted at all times.

(d) The ground guide will be stationed so as to be clearly visible to approaching aircraft. The position of the ground guide for—

1. Fixed-wing aircraft is on a line extending forward of and at an oblique angle from the left (port) wing. The pilot's eyes must be visible to the ground guide.

2. Rotary-wing aircraft is almost the same as that for a fixed-wing aircraft. However, the ground guide may be on either side of the aircraft as long as the pilot's eyes are visible.

c. An aircrew member will give detailed briefings to all personnel being transported aboard aircraft.

d. All personnel riding in Army helicopters will have their sleeves rolled down.

e. Drivers will use extreme caution when operating vehicles around parked or operating aircraft. As a minimum, vehicle drivers will—

(1) Not approach operating aircraft without clearance from the aircraft commander.

(2) Stow vehicle radio antennas before approaching aircraft parking or operation areas.

(3) Not drive vehicles directly toward an aircraft. Brake failure or accelerator malfunctions could cause a serious accident.

(4) Keep at least 50 feet between vehicles and aircraft (unless licensed to operate near aircraft according to AR 600-55 and FM 1-300). Vehicles with catalytic converters should always stay at least 50 feet from aircraft.

(5) Not back a vehicle into a position near an aircraft. If a vehicle must be backed into position, the driver should come to a full stop at least 20 feet from the aircraft or helicopter rotor blades, use a ground guide, and follow the guide's signals.

(6) Not leave vehicles unattended close to an aircraft unless the vehicle engine is off, the transmission is in low gear (or park if automatic), and the parking brake is set.

(7) Conduct refueling operations according to FM 10-67-1 and local installation or unit SOPs.

(8) Not exceed the maximum speed limit on an airfield ramp or near aircraft (5 miles per hour (excluding emergency vehicles)).

(9) Not exceed 5 miles per hour within 50 feet of aircraft.

f. Passengers will sit in authorized aircraft seats and will use seatbelts. Requests for exception to policy must be sent, with a written risk assessment, through the USAREUR Safety and Occupational Health Office to the USAREUR G3 (AEAGC-AV).

g. The pilot in command (PC) is responsible for safety in and around the aircraft. The orders of the PC or the crew chief are legal orders that soldiers must follow.

26. AVIATION OPERATION REQUIREMENTS

U.S. Army visual flight rule (VFR) guidelines for day and night operations are as follows:

a. VFR operations will be conducted according to AR 95-1 and aviation procedural guides published for applicable operations.

b. Procedures for obtaining weather briefings will be published for each operation. Commanders also may obtain weather service by calling the U.S. Army Flight Operations Detachment (DSN 373-6201/6202, civ 06221-17-6201/6202). Weather services is also available on-line at <http://afod.hqusareur.army.mil>.

c. Commanders will—

(1) Present a mission briefing to aircrews before they conduct aviation missions. Supporting and supported unit commanders will work together to designate persons to give the briefing when aircrews are separated from their parent units.

(2) Publish requirements for navigation and communication equipment for each operation.

d. Single aircraft will flight-follow (keep in radio contact) when operating alone in operational airspace. One aircraft in each formation operating in the area will flight-follow for the formation. Tactical aircraft may flight-follow with its unit operations section, another aircraft, or established flight-following facilities. Administrative missions will flight-follow with established flight-following facilities.

e. Aircraft in an operational area must have the following on board for each mission:

- (1) The current DOD flight information publication.
- (2) The exercise aviator-procedures guide.
- (3) Exercise maps that cover the exercise flying area and include wire-hazard overlays.
- (4) Publications required by the applicable operators manual.

f. Aviators will be thoroughly familiar with the procedures for inadvertent instrument meteorological conditions (IMCs).

g. The following topics require additional emphasis:

- (1) Wire- and tree-strike prevention.
- (2) Restricted visibility because of environmental conditions (for example, snow, dust, ice).
- (3) Procedures for poor weather conditions.
- (4) Crew endurance criteria in the unit SOP. Commanders will use the techniques and procedures in the United States Army Safety Center publication, "Leader's Guide to Crew Endurance."

NOTE: This guide is available at <http://safety.army.mil/pages/pov/arac/crewend.pdf> or from the United States Army Safety Center.

- (5) Refueling procedures.
- (6) Sling-load operations.
- (7) Crew coordination sustainment training. This training will be conducted according to published USAREUR Aviation Safety and Standardization Detachment and other USAREUR guidance.
- (8) Terrain-flight procedures.
- (9) Accident-reporting procedures.

(10) Pre-mission planning.

(11) Field maintenance procedures.

(12) Aircrew medical treatment.

(13) High-intensity radio transmission areas (HIRTAs). During mission planning, units will review current procedures for operations in possible HIRTAs. Aircrews should keep in mind as they conduct missions into new areas that they may not know of all the HIRTAs. The unit S2 can provide the latest available information.

(14) Mission rehearsals. Units should use the crawl-walk-run approach to conducting mission rehearsals. If possible, conduct night missions during the day then move to night operations.

(15) Hazardous materials transported by fixed- or rotary-wing aircraft must be prepared, documented, and certified as prescribed by AR 95-1 and TM 38-250.

27. MEDICAL AIR EVACUATION PROCEDURES

a. Army medical evacuation (MEDEVAC) services will be available.

b. The standard peacetime AN/VCR-12-series radio frequency (RF) to request air MEDEVAC is 30.75 megahertz. The new squelch control must be set to the "on" position. Supporting MEDEVAC aircrews must be informed when PCR-77 radios are the only radios in use by supporting units or when an air MEDEVAC mission can be expected to be relayed by telephone.

c. Air-ambulance MEDEVAC is only for patients. Priorities are as follows:

(1) Urgent. The MEDEVAC is required immediately to save a life or limb.

(2) Priority. The MEDEVAC is required within 4 hours.

(3) Routine. The MEDEVAC is required within 12 hours.

d. Persons requesting air-ambulance service will provide the following information:

- (1) Location of pickup site (8-digit grid coordinates).
- (2) Patient's destination.
- (3) Radio frequency or telephone number of caller (b above).
- (4) Number of patients who are urgent, priority, and routine (c above).
- (5) Special equipment that will be needed (for example, CO₂, incubator, strokes, ventilator).
- (6) Number of patients by type who will be carried by litter or who are ambulatory.
- (7) Number and types of wounds, injuries, or illnesses.
- (8) Method of marking the pickup site (smoke, panel, flare, strobe).
- (9) Patient nationality and status.
- (10) Terrain description and hazards to landing.
- (11) Attendants and passengers to be transported with patients.

SECTION VIII RAIL OPERATIONS

28. PREOPERATION REQUIREMENTS

a. Commanders. Before beginning rail-loading operations, commanders will ensure—

- (1) Personnel conduct a risk analysis of the railhead site, considering common risk factors.
- (2) Load teams are certified according to AE Pamphlet 385-15-2 and participants are briefed and instructed on safety standards and procedures.
- (3) Safety equipment (such as flashlights, hardhats, gloves, reflective vests) and supervisory personnel or ground guides are available.

(4) Medical support is available at loading and unloading sites. Medical support is at least a first-aid kit and suitable transportation for injured personnel.

(5) Unit safety personnel are available. Commanders will monitor safety standards.

(6) Soldiers are shown the location of high-voltage lines and other hazards.

(7) The unit preaccident plan covers rail-loading and -unloading operations.

b. Train Commanders. Train commanders will ensure the following requirements have been met before rail loading or unloading:

(1) Military units and organization personnel have been—

(a) Briefed on regulatory requirements before each rail movement.

(b) Made aware of unsafe conditions in the railhead area.

(c) Told to keep a safe distance from electric powerlines and systems in the workarea. Electrified rail systems with overhead powerlines and feeder lines installed beside rail tracks carry 15,000 or more volts.

(2) Supervisors are aware that—

(a) When powerlines are switched on temporarily for technical reasons—

1. Operations must cease.

2. The area must be cleared of personnel.

3. Operations must not resume until the appropriate railway authority (for example, *Deutsche Bahn AG* (German Railroad Company) in Germany) confirms that electricity has been shut off and grounded in the railhead area.

(b) While supplies are moved, escorts will not ride in freight cars or vehicles loaded on railcars.

c. Transportation Officers or Representatives. The transportation officer or representative will—

(1) Coordinate with the responsible railway official and confirm that electric overhead powerlines have been shut off and grounded in the railhead workarea. Operations must not start until confirmation is received.

(2) Keep units informed of changing conditions.

(3) Enforce the rules of conduct for ensuring safe operations.

(4) Make soldiers aware of warning signs posted in the local workarea and affixed to railway equipment. Equipment with steps or stepladders extending higher than 2 meters (6 feet, 7 inches) above the rail surface must be avoided.

d. Personnel. Personnel will—

(1) Wear approved industrial hardhats. In cases where hardhats are not available, Kevlar helmets will be worn.

(2) Be equipped with reflective vests and flashlights during times of darkness or limited visibility.

(3) Not work or walk on top of rail-loaded vehicles without specific permission from the officer in charge (OIC) or noncommissioned officer in charge (NCOIC). Only the OIC or NCOIC may declare an area safe from electric hazards after coordinating with the transportation officer.

(4) Be informed that the local transportation representative in charge of rail uploading or downloading is the only person authorized to inform the HN supervisor when railcars may be moved. The transportation representative will be the only person wearing a white armband.

e. Vehicle Operators. Vehicle operators will remove whip antennas from vehicles before entering a rail-loading site. Antennas will not be remounted until vehicles are in the staging area, away from electric hazards. Turrets must be locked during shipment.

29. LOADING AND UNLOADING PROCEDURES

a. The OIC or NCOIC will ensure—

(1) Support legs have been lowered and tailgates and side braces are removed (if necessary) before loading or unloading operations.

(2) Trash has been cleared from the area before the train leaves.

(3) Railcars are inspected before loading to ensure ice, snow, nails, and dunnage (glossary), have been removed.

b. Ground guides must be used when moving vehicles in staging areas. UR 385-55 provides ground-guide requirements for various types of vehicles. Ground guides will—

(1) Use arm-and-hand signals prescribed by FM 21-60 (with flashlights after dark).

(2) Not run, walk backwards, or place themselves in a dangerous position between two vehicles or between a vehicle and a fixed object.

c. Train commanders will lock the tracks and control the keys.

d. Hazardous material will be secured and the vehicle, container, and railcars will be placarded as prescribed in AE Regulation 55-4.

e. The HN railhead wagonmaster will check equipment with traversing tubes or booms.

f. Commanders will ensure personnel working at railheads are briefed on the following procedures. Personnel will not—

(1) Be on the same railcar as a moving vehicle. The only exception is when a second or third vehicle is being placed on a railcar capable of carrying two or three vehicles. The second or third vehicle will move forward only after the first vehicle has stopped completely.

(2) Ride in or climb on tanks, vehicles, and other equipment being transported by rail after the vehicles and equipment have been locked.

(3) Enter equipment or vehicles during stops.

g. Vehicles must be secured by chockblocks and bracing locking the sides.

h. Commanders will ensure—

(1) Vehicles are properly secured.

(2) Gun barrels are locked and secured (confirmed by the OIC in the consignment note).

(3) All personnel are off of the railcars before they are moved and before overhead power is restored.

(4) Railcars are returned well swept (after unloading) and nails and wire remnants are removed completely.

30. RAIL SUPERCARGO OPERATIONS

a. This paragraph applies to the time between the railhead loading completion and the declaration that it is safe to unload. Rail operation incidents can be minimized by establishing procedures to reemphasize the hazards associated with this type of operation and the designation of security teams with an NCOIC responsible for the safety of the security team.

b. Deployment of guard-force personnel during unscheduled stops is a high-risk operation. Risks must be reassessed at each stop. Forces should be deployed only after considering security requirements, length of delay, and risks to soldiers. Always assume tracks are active and powerlines are live. High-risk actions include—

- (1) Sticking head or arms out an open window.
- (2) Walking or standing between a stopped train and active tracks.
- (3) Walking along or across active tracks.
- (4) Walking near switch tracks.
- (5) Climbing on loads or on railcars. (This is forbidden in all cases by the CG, USAREUR/7A.)
- (6) Using tools or equipment that may come within 1.5 meters of an overhead wire.

c. The OIC or NCOIC of the shipment—

- (1) Must be in the rank of sergeant or above.
- (2) Will be responsible for the overall security of the cargo being shipped.

NOTE: The engineer of the train is responsible only for the train, not the security of the cargo.

- (3) Will ensure that all personnel providing security have been briefed on safety standards as well as use of force.

(4) Will ensure that only the security detail dismounts.

d. Personnel performing guard duties for rail shipments will adhere to the following guidelines:

(1) Guards must be aware that the overhead rail powerlines contain approximately 15,000 volts of electricity. Contact or even being close to these lines can be fatal.

(2) Guards and other personnel are forbidden from climbing on loads or railcars.

(3) Tools, ladders, poles, and other equipment may not be carried or used where it is possible that they will come within 1.5 meters of overhead powerlines.

(4) If there are multiple tracks, soldiers must be aware of the possibility of other rail traffic passing by while they are on the ground guarding their shipment.

(5) Express trains can travel faster than 100 mph and may create a vacuum strong enough to pull a person under the wheels. If necessary, guards will place their back firmly against the shipment if an express train is passing them while they are guarding the shipment.

(6) If the shipment is stopped next to an express traintrack, guards will monitor the shipment from only one side of the train or, if that is not possible, from the windows of the car in which they are riding.

(7) Soldiers must be aware of the dangers of slow-moving trains and coasting trains.

(a) Caution must be used when crossing tracks or between railcars. Slow-moving trains are less noisy and do not cause the vibrations of express trains, but the danger is no less significant.

(b) In most railyards, cars are moved from one track to another by pushing the cars up a ramp and letting them coast down the other side through a remotely controlled switch onto the proper track.

(8) Soldiers will never step directly into or on a switch. Most rail switches are controlled by an operator as far as 10 kilometers away. This makes the switches unpredictable and hazardous. These switches can be moved by heavy wire cables that run along the ground at heights varying

from 10 to 24 inches off the ground. Guards need to be aware of the cables to avoid tripping over them.

(9) Due to lack of clearance space between trains and objects common to railways (overpasses, bridge trestles, signs), personnel will not lean out of windows unless the train is stopped, and then only when it is away from active tracks and necessary to observe the shipment.

(10) Doors must not be opened while the train is moving.

(11) The OIC or NCOIC will notify the train engineer if members of the unit get off the train during a halt. The engineer will be asked to notify the OIC or the NCOIC before moving the train again. Personnel will maintain constant surveillance of the railcars. Guards will wear reflectorized vests when performing guard duties.

(12) The train commander, OIC, or NCOIC will contact the train engineer before halts and ask for information about the environment where the train will stop. At least the following information should be obtained:

- (a) Hazards at the stop.
- (b) Possibility of adjacent tracks used by high-speed trains.
- (c) The existence of overhead electric powerlines.
- (d) Temperature and precipitation.

(13) If the train will only be stopped for a few minutes or for some unscheduled reason, attempts will be made to maintain surveillance of the shipment from windows from nonactive track sides of the cars unless specifically directed otherwise by the OIC or NCOIC after coordination with the engineer ((11) above).

(14) If for some reason the train starts moving and an individual has not returned to the train, that individual will not attempt to run and jump onto the train. The OIC or NCOIC will notify that person's unit and the individual will be picked up and will follow with the next available transportation. This requires commanders to write and provide written procedures to all personnel on what to do if separated.

**SECTION IX
PORT OPERATIONS**

31. PREOPERATION REQUIREMENTS

a. Before beginning port operations, commanders will—

(1) Ensure personnel conduct a risk analysis of the port by considering common risk factors.

(2) Establish a port-operation SOP.

(3) Appoint a port safety officer and safety NCO. Commanders will determine the number of safety NCOs required based on the risk at the port.

(4) Identify nonswimmers. Commanders will establish a method to identify nonswimmers working at the port.

(5) Ensure the Military Traffic Management Command Personal Property Office-Europe (MTPP-E) and unit safety personnel conduct safety briefings at the port.

b. The port SOP must include at least the following:

(1) Uniform requirements.

(2) The requirement to wear hardhats when working at the port.

(3) Smoking policy (location of smoking area).

(4) Fire-prevention plan.

(5) Preaccident plan (including the location of the ambulance or medical facility).

(6) Speed limits.

(7) Use of ground guides.

(8) Night operation safety requirements (use of reflective vest and flash-lights).

(9) Policy to ensure that the MTPP-E supplies life-saving rings or other flotation devices.

- (10) Personnel accountability.
- c. Port safety officers and safety NCOs will—
 - (1) Be present during port operations.
 - (2) Conduct required safety briefings. Safety briefings must cover at least the following topics:
 - (a) Authorized break and rest areas.
 - (b) Location of medical personnel.
 - (c) Off-limit areas and port-area hazards.
 - (d) Smoking or open flames.
 - (e) SOP.
 - (f) Suspended load safety.
 - (g) The port as a hardhat area.
 - (3) Enforce safety standards, conduct on-site risk assessments (as required), and report accidents.
- d. Individuals involved in port operations will—
 - (1) Report unsafe working conditions or actions.
 - (2) Obey safety regulations.
 - (3) Wear required protective clothing and protective equipment.

32. OPERATIONS

- a. Commanders are responsible for unit personnel involved in port operations.
- b. Unit safety personnel must be at the port during operations.
- c. Individuals will comply with port rules and obey speed limits.
- d. Ground guides must be used, as required.

**SECTION X
FIRE PREVENTION AND PROTECTION**

33. RESPONSIBILITIES

a. Commanders will appoint a fire marshal, fire wardens, and a safety officer for each field site or bivouac area. A fire-prevention and -protection plan must be established for each site.

b. Fire marshals will conduct periodic fire inspections in bivouac and maintenance areas.

c. Fire marshals and safety officers will work together to ensure units provide personnel a predeployment briefing that includes the fire-prevention standards in this section.

34. TENTS

a. Tents to billet personnel and store unit equipment and supplies will be set up in rows with a 2-meter clearance on all sides. A 9-meter clearance must be kept between a double row of tents and any other row of tents with frames.

b. Tents must be set up away from roads and trails. Tent ropes should not be crossed.

c. Tent areas must be level and free of potholes, sharp rocks, and other hazards.

d. Petroleum, oils, and lubricants (POL) storage areas will not be located within 50 feet of tents. When possible, POL storage areas must be located at a lower elevation than bivouac areas.

e. Walking paths between tents must be planned and established.

f. Camouflage nets must not touch space heater stovepipes in tents.

g. Stovepipe flaps must be rolled back and secured before stoves are operated.

35. INSTALLING AND OPERATING SPACE HEATERS

a. Unvented heaters are not authorized for use by any unit operating in the USAREUR area of operations. This prohibition applies in training areas,

guard shacks, tents, “tent cities,” military-owned demountable containers (MILVANs), and other locations that require heaters.

b. Vented heaters include forced-air heaters that have fuel, ignition, and heat sources located outside of tents and structures. Appendix E lists approved heaters belonging to the family of space heaters (FOSH) with NSNs and descriptions. Commercial off-the-shelf (COTS) and electric heaters may be authorized if they are approved by a reputable national standards organization (for example, Underwriters Laboratories (UL), American National Standards Institute (ANSI), International Standards Organization (ISO)) or have a “CE” label indicating that the heater is approved for use in the European Community.

c. If electric heaters are used outdoors or in a damp environment, a ground fault interrupter must be installed between the heater and the power source. TM 10-4500-200-13 provides operating instructions and preventive maintenance checklists for using M1941 type I and II and M1950 solid- or liquid-fuel space heaters. Heater model H-45 type I and type II operation and maintenance instructions are in TM 9-4520-257-12&P. Personnel will consult TM 9-4520-257-12&P or TM 10-4500-200-13 when installing space heaters.

d. In addition to the requirements in subparagraphs a through c above, commanders will—

(1) Develop and implement a field fire-alarm system. A fire extinguisher, shovel, and ax must be available at selected fire points.

(2) Inform soldiers of the location of fire points.

(3) Select, train, and license personnel in operator maintenance of fuel systems (e(12) below) according to AR 600-55. Soldiers who do not receive training and who are not licensed will not install or operate space heaters.

(4) Instruct soldiers not to place sealed watercans on heaters. Boiling water may cause a sealed can to explode because of increased pressure as the liquid changes to vapor.

(5) Instruct soldiers not to place wet clothing within 24 inches of stoves.

(6) Designate a fireguard for each tent. Commanders will brief fireguards on fire hazards and on conditions that may cause asphyxiation.

(7) Appoint a roving guard to conduct hourly inspections when several tents are erected in the same area. Guards will remove fire and asphyxiation hazards.

e. Tent heaters must be installed so that the straight vertical smoke pipe exits through the center of the appropriate tent opening. The body of the heater must be oriented around the vertical axis of the smoke pipe so as to provide maximum possible clearance from the tent wall. Combustibles must be kept at least 4 feet from the heater.

(1) Tent stoves with float valves and overflow outlets must be equipped with a hose to drain the overflow.

(2) The M1941 potbellied stove must be fueled only with JP8. The M1950 Yukon stove must be fueled only with gasoline.

(3) At least two sheetmetal screws or rivets must be used to secure the ends of each pipe section.

(4) At least two pipe sections must extend above the tent peak.

(5) Spark arresters must be installed on model M1941, type I, solid-fuel space heaters.

(6) A draft diverter must be installed at the top of exhaust pipes of M1941, type II, and M1950 Yukon liquid-fuel space heaters.

(7) A 2-inch ventilation space must be kept between the exhaust pipe and the tent.

(8) Three guy wires must be used to secure exhaust pipes. These wires should be attached to tent lines.

(9) The ties for the stovepipe openings must be tied back to avoid contact with the hot pipes. These ties are combustible.

(10) The fuel can, fuel-line connection, and carburetor must be checked for leaks after changing fuel cans. Leaks must be corrected before continuing operation.

(11) Space heaters must be turned off and allowed to cool for at least 30 minutes before refueling or relighting.

(12) Fuel systems (including fuel-tank lines and connections of heating devices) must be checked daily for leaks and malfunctions. Only qualified maintenance personnel will make repairs. Equipment must be turned in through supply channels when local maintenance personnel are unable to make repairs.

(13) Heating equipment will not be modified locally.

(14) Flammable liquids must be kept at least 50 feet from space heaters to prevent accidental ignition or explosion.

(15) Ammunition, combustible or corrosive materials, explosives, pyrotechnics, and simulators must not be stored in tents with stoves or other heating sources.

(16) Unvented kerosene heaters will not be used.

(17) Propane heaters will not be used.

f. Only heaters with a ventilation system that is compatible with shielded tent-vent-stack openings will be used. Heaters must be—

(1) Equipped with emergency fuel shut-offs.

(2) Located on firm, level, fireproof bases. The bases must be in a clear area, kept free of clothing and other combustible material, and marked.

g. Commanders will publish SOPs that include the principles in this paragraph.

h. A fire watch will be maintained for tents using gas- or liquid-fueled heaters when combustion takes place in the tent. The watch will be briefed on alarm procedures, fire extinguishing, and early recognition of carbon-monoxide poisoning. Heaters will not be run unattended.

i. Fuel tanks must be located outside tents and shelters with appropriate secondary containment.

j. Heaters must be set up by competent individuals familiar with leak-test procedures. Unit maintenance personnel will inspect heaters before they are used.

k. Heaters must be fueled, used, and maintained according to manufacturers instructions. Unapproved modifications and adapters (“cheaters”) will not be used.

1. Fuel must be transported only in Department of Transportation- or European CE-approved containers.

36. FIELD MESS

a. General. FM 10-23 addresses safety considerations and the layout for field-mess operations. Commanders will brief mess personnel on safety guidance in this pamphlet and FM 10-23, chapter 12. Safety guidance includes proper operating procedures for using M2-burner units, storing flammable liquids, and controlling ignition sources. Soldiers will change clothes before igniting burners if they spill fuel on their clothing while refueling any of the equipment described in subparagraphs b through d below.

b. M2-Burner Units. Only properly trained and licensed (AR 600-55) personnel will operate M2-burner units (TM 10-7360-204-13&P). Soldiers operating M2 burners will—

(1) Ensure fuel tanks are at least 50 feet from open flames and other flammable sources before filling them.

(2) Store burner fuel (gasoline) at least 50 feet outside of kitchen enclosures.

(3) Not fill a tank while a flame is burning or when a burner is hot.

(4) Wipe up spilled fuel immediately and dispose of cleaning materials in a flameproof container.

(5) Not operate a burner when the pressure gauge reaches or exceeds 25 pounds per square inch or is in the “red” area.

(6) Not release fuel tanks until the burners have cooled. This ensures escaping gas vapor does not ignite.

(7) Not tighten joints while a burner is operating.

c. Immersion Heaters. Soldiers operating immersion heaters will—

(1) Be licensed (AR 600-55) to operate an immersion heater.

(2) Know the type of heater they are working with.

(3) Check TM 9-4540-202-12&P or TM 10-4500-200-13, as appropriate, for preheating and lighting instructions.

(4) Ensure ventilating-pipe seams are aligned and face away from where the user will stand.

(5) Keep a fire extinguisher (dry chemical CO₂) near equipment.

(6) Choose a level, sheltered site for the corrugated cans.

(7) Ensure exhaust gases are funneled outside through pipes when a heater is in an enclosed space.

(8) Wipe up spilled fuel immediately and dispose of cleaning materials in a flameproof container.

(9) Ensure the valve ends of fuel tanks are dry and free of fuel.

(10) Ensure there is no fuel in the combustion chamber of a heater before the burner is lit.

(11) Ensure water is at least 3 inches above the top of the combustion chamber.

(12) Not allow fuel to flow in a steady stream.

(13) Ensure the burner assembly is in the burner compartment before lighting a heater.

(14) Turn in defective heaters to supporting maintenance facilities.

(15) Use motor gasoline for fuel. Diesel fuel will not be used.

(16) Not solder any part of a heater.

d. Gasoline Lanterns. If gasoline lanterns are not operated or maintained properly, tent fires, explosions, and personal injury may occur. Soldiers will—

(1) Inspect lanterns for loose, damaged, or missing parts. Nuts and caps on lanterns will be hand-tightened.

(2) Not place lanterns near space heaters. The pressure seal on lanterns may rupture, allowing fuel to escape.

(3) Inspect ventilator-hood openings to ensure the openings are free of obstructions.

(4) Ensure the pump leather is lubricated properly and in good condition.

(5) Ensure the filler-cap gasket is on and in good condition.

(6) Allow lanterns to cool before refueling. Refuel only in an open, well-ventilated area.

37. FIRE PREVENTION STANDARDS

a. International “no smoking” signs must be posted at POL and ammunition storage areas. The words must be in red letters on a white background.

b. FM 10-67-1 defines POL storage and handling procedures. POL vehicles must be bonded and grounded at field locations. Fire extinguishers must be located outside POL points (storage locations).

c. Privately owned heating and cooking devices will not be used in tents, containers, buildings, or vehicles.

d. Smoking is prohibited within 50 feet of vehicles carrying explosives or flammable fuels.

e. Fuel cans must have serviceable gaskets.

f. Gasoline will not be used as a cleaning solvent or a fire starter.

g. Personnel will—

(1) Ensure areas in and around vehicles, tents, buildings, and storage areas are clean. Cigarettes must be extinguished completely before they are discarded. Designated smoking areas should have appropriate metal containers for disposal.

(2) Not smoke in or around ammunition, fuel, or other items where smoking could cause a fire or explosion. Personnel will not smoke in beds, sleeping bags, or tents.

(3) Ensure designated smoking areas are established.

h. HN laws may prohibit open fires (including cigarette smoking) in forests, woods, and other locations where fires may present a hazard.

i. Only trained personnel will install electrical wiring and equipment.

(1) Circuit breakers and fuses must not be bypassed or replaced with circuit breakers and fuses of higher amperage. The current must be turned off until trained personnel correct faults in electrical wiring (for example, blown fuses, exposed conductors, overheating, repeated tripping of the circuit breaker, short circuits). Designated smoking areas should have appropriate metal containers for disposal.

(2) Lamp fixtures must be supported so they are not suspended directly by electrical connections.

(3) Ground fault interrupters must be used when appropriate. When working with electric circuits, use lockout/tagout procedures according to Occupational Safety and Health Act (OSHA) standards (Code of Federal Regulations, title 29, part 1910).

j. Gasoline in portable containers must be stored in stacks using secondary containment. Each stack must—

(1) Not exceed 1,000 gallons.

(2) Be at least 5 feet from the next stack.

(3) Not be closer than 50 feet to occupied buildings, combustible storage areas, warehouses, or tents.

(4) Be located at lower elevations than bivouac and life-support areas when possible.

k. A daily working supply of lubricants with a flashpoint of more than 100 °F may be stored in shops and maintenance areas. Gasoline and other flammable fuels with a flashpoint of 100 °F or less must not be stored in buildings, tents, or other structures with closed sides.

l. Gasoline and other flammable liquids must not be used to start solid-fuel fires.

m. Vehicles, trailers, and temporary storage areas containing packed or bulk flammable and combustible liquids must be located at least 50 feet from—

(1) Vehicles loaded with explosives and ammunition.

(2) Structures and other vehicles when the amount of flammable liquid is 750 gallons or less.

n. Incendiary devices for destroying classified material must be stored so that an accidental ignition would not be hazardous. Installing explosives and pyrotechnics for additional security of classified material is prohibited.

o. Commanders will designate and mark authorized smoking areas clearly. Grass, leaves, and other combustible materials must be removed from designated smoking areas. Butt cans must be provided. Supervisors will instruct soldiers to empty butt cans into trash containers only after smoking materials have been extinguished completely.

p. Vehicle operators will turn off vehicles being refueled.

38. LITHIUM BATTERIES

a. The Army's lithium battery is a lightweight, high-energy, portable power source with several built-in safety features.

b. In military use, lithium batteries have shown that they can stand up to normal handling, storage, and use conditions. However, they must be handled with care to prevent hazardous conditions.

c. The procedures that follow will minimize any risks associated with the use of these batteries.

(1) Batteries should be stored in original packaging until ready for use. Store batteries in a cool, dry, well-ventilated area with plenty of clearance on all sides. Do not store batteries with other combustible or hazardous materials.

(2) Coordinate fire-protection measures with the local fire department for battery storage facilities and only use an approved class D (for example, graphite-based) fire extinguisher for lithium battery fires; do not use Halon fire extinguishers to combat fires involving lithium batteries. Do not smoke or use open flame in battery storage areas.

(3) Before use, check batteries for obvious defects or damage and only use in authorized equipment. Do not use batteries that have obvious defects, damage, or which have a liquid within the plastic wrap.

(4) If the equipment uses more than one battery, use batteries of the same age (check lot code) and manufacturer whenever possible. Replace the batteries at the same time and use batteries from stock on a first-in, first-out basis.

(5) Remove batteries from equipment immediately after it fails to operate the equipment. Shut off equipment if the battery compartment becomes hot. Wait for compartment to cool before removing the battery.

(6) Leave the immediate area if either the equipment or the battery emits an irritating odor. Report battery venting or incidents to the local safety office or CECOM representative within 24 hours. Keep the battery and equipment involved in any incident for further analysis.

d. For more information on lithium batteries, contact the local safety office or CECOM representative.

e. Lithium batteries are transported as hazardous material and disposed of as hazardous waste.

SECTION XI POL SAFETY

39. GENERAL

Commanders will—

a. Enforce standards, develop procedures, and assign responsibilities for handling hazardous cargo, forms, attaching vehicle placards, and taking emergency actions (AE Reg 55-4).

b. Implement a training program for personnel involved in refueling operations. This training will include instruction on—

(1) Appropriate spacing between refueling and storage points and between refueling points and pumps. Spacing standards will be based on field and technical manuals for the pumps and tanker units being used (FM 10-67-1).

(2) Reporting fuel spills on U.S. installations to the local directorate of public works (DPW).

(3) Notifying the local fire brigade and the nearest U.S. military fire station.

(4) Establishing a POL servicing point.

(5) Using a receptacle (a 5-gallon can that is emptied daily) for the nozzle.

(6) Establishing a grounding system. A grounding rod (NSN 5975-00-224-5260 or 5975-00-404-2684) and a grounding wire (NSN 2590-00-792-8621) may be used.

c. Ensure fire extinguishers are placed as follows:

(1) A 20-pound carbon dioxide (CO₂) or dry chemical extinguisher is available at each tank and pump unit.

(2) One 15-pound CO₂ or dry chemical extinguisher is available at each nozzle point.

d. Ensure—

(1) Filters, hose joints, hoses, nozzles, pumps, and tanks are inspected daily.

(2) Tripping hazards are marked with reflective tape during night operations.

(3) Personnel operating fuel points wear protective clothing and equipment.

(4) Explosion-proof lights are used during night operations.

(5) Operators immediately shut down fueling operations when a potential hazard (such as spills, leaks, lack of fire extinguishers) is recognized.

e. Place international “no smoking” signs at least 50 feet from refueling points and fuel tanks. Words will be in red letters on a white background.

f. Mark the fuel type (motor gasoline, JP8, or other) clearly at fuel points.

g. Stop fueling operations when there are thunderstorms within 5 miles of the site.

h. Ensure a written fire plan is available on site. The fire plan must explain how to—

- (1) Assign personnel.
- (2) Conduct fire drills, including hands-on fire-extinguisher training.
- (3) Control fuel.
- (4) Evacuate using assigned routes.
- (5) Handle fuel spills.
- (6) Place fire extinguishers.

40. REFUELING PROCEDURES

When refueling—

a. Drivers will move their vehicles to refueling points, shut down the vehicles, and turn off all communication devices, including radios and cell phones. Drivers and passengers will get out of the vehicles.

b. Fuel-tank operators will—

- (1) Not wear nylon outer or under clothing.
- (2) Use protective gloves, goggles, and uniforms.
- (3) Position the fire extinguishers.
- (4) Electrically ground fuel tankers. Operators will bond the nozzle to the vehicle being refueled using a bonding cable or by touching the end of the nozzle to the filler neck.
- (5) Squeeze the nozzle to stop pressure surges. Nozzles will not be notched to keep them open.
- (6) Stand by the nozzle at all times.
- (7) Release fuel tanker electrical grounding points.
- (8) Release the ground ((4) above).

(9) Not park closer than 15 feet from another vehicle during fuel issue or receipt operations.

41. POL SUPPLY-POINT REQUIREMENTS

Commanders will ensure—

- a. A checkpoint is established to extinguish smoking materials.
- b. Lighting devices (for example, lighters, matches) are collected and stored.
- c. Self-closing metal containers are used to dispose of oily waste, rags, and rubbish.
- d. Hot work (such as welding) is coordinated with the fire department. Mechanical or friction sparks are dangerous when produced near POL.
- e. Bonding and grounding systems are inspected daily.
- f. Drip pans are used for hose joints and tanker hookup points.
- g. Spills are cleaned up at once.
- h. The fire department reports to the site for a washdown when the washdown is ecologically permissible.
- i. Containers are inspected before they are filled and are marked with the type of fuel being stored.
- j. Fuel is not used for cleaning.
- k. Personnel know firefighting and evacuation procedures and how to use fire extinguishers.

SECTION XII FIELD MAINTENANCE OPERATIONS

42. FIRE PREVENTION

To prevent fires during field maintenance, commanders will—

- a. Post “no smoking” signs in shop areas. Smoking will be permitted only in designated areas. Smoking will not be permitted within 50 feet of vehicles or stored flammables.

b. Store cleaning solutions, paint, and POL products only in designated areas and minimize storage quantities.

c. Not use gasoline as a cleaning solvent.

d. Separate and store dirty, oily rags in covered metal containers.

e. Ensure vehicles are parked at least 15 meters from buildings and tents. Vehicles must not block exits.

f. Ensure equipment is not refueled inside tents, enclosures, or buildings, or when an engine (including power generators, small engineering equipment) or heater is running or hot.

g. Ensure personnel clean areas to reduce fire and other safety hazards. Personnel will be trained in the proper use of fire extinguishers.

43. BRAKE-TESTING ARMY MOTOR VEHICLES

a. Commanders of United States Army Installation Management Agency, Europe Region Office (IMA-Europe), and USAREUR units will ensure assigned and attached Army motor vehicles and trailers with service-brake systems are tested according to USAREUR Supplement 1 to AR 750-1, appendix AA.

b. The following exceptions to subparagraph a above apply:

(1) Trailers, $\frac{3}{4}$ -ton and less, that are not designed to work with prime-mover brakes and have only a parking brake are exempt from the policy in USAREUR Supplement 1 to AR 750-1, appendix AA. The following trailers are exempt from the brake-machine testing policy; they will be tested using the trailer's TM procedures.

(a) The $\frac{1}{4}$ -ton cargo trailer, M416 series.

(b) The $\frac{3}{4}$ -ton trailer, M101 series.

(2) The $1\frac{1}{2}$ -ton cargo trailer, M105-series, is exempt from the machine brake-testing policy only when normally towed by M113-, M548-, or M577-series tracked vehicles.

(3) Service and parking brakes of M1070 heavy equipment transporters (HETs) and HET M1000 semitrailers will be tested according to vehicle TMs.

(4) Forklift and wheeled construction vehicle brake systems will be tested according to the equipment TM.

(5) U.S. Army tactical wheeled vehicles maintained in Greece, Italy, and Turkey are exempt from brake-machine testing. These countries do not use machines to test vehicle brakes.

(6) Units based in or deployed to countries that do not brake-machine test their vehicles are not required to comply with the brake-machine test provisions of USAREUR Supplement 1 to AR 750-1, appendix AA. These units will service and maintain brakes according to the respective vehicle TM.

(7) Units based in or deployed to a country that does not brake-machine test their vehicles do not have to brake-machine test their vehicles with one exception: vehicles that will be transporting hazardous material (HAZMAT) (for example, petroleum products, munitions) must be brake-machine tested before transporting HAZMAT.

(a) AE Regulation 55-4 establishes requirements for vehicles transporting HAZMAT.

(b) DA Form 5988-E will serve as a hazardous vehicle certification permit (HVCP) when over-stamped according to AE Regulation 55-4.

(c) The date of the brake test and the due date of the next brake test (within 1 year) must be noted on both DA Form 5987-E and DA Form 5988-E, which will be issued with each dispatched vehicle.

44. OPERATING VEHICLES IN MAINTENANCE AREAS

a. The maximum speed in motorpools is 5 miles per hour.

b. Only properly licensed drivers will start or operate vehicles.

c. Drivers will—

(1) Not leave a vehicle unattended while the engine is running.

(2) Use the rear safety strap when transporting personnel in vehicle cargo beds. Riders in cargo beds will stay seated while the vehicle is moving. The Kevlar helmet must be worn by all U.S. Army personnel operating or riding in tactical vehicles during field training exercises, tactical operations, and all convoys operating with or without movement credits.

- (3) Use ground guides when moving a vehicle in a motorpool.
- d. Ground guides will—
 - (1) Not run when guiding vehicles.
 - (2) Work in pairs when backing vehicles.
 - (3) Always be visible to the driver.
 - (4) Know and use the proper arm-and-hand (marshaling) signals in FM 21-60 and FM 21-305.
 - (5) Not stand between a moving vehicle and an object.
- e. Persons riding in tracked vehicles will—
 - (1) Wear head protection.
 - (2) Not sit on top of vehicles.
 - (3) Use installed seatbelts.
- f. Exhaust must be vented outside when vehicles with internal combustion engines are used in enclosed areas.
- g. Parked vehicles must be spaced and arranged so vehicles and fire lanes are accessible.

45. PERSONNEL SAFETY IN MAINTENANCE OPERATIONS

- a. Commanders will—
 - (1) Not permit horseplay in maintenance facilities or surrounding areas.
 - (2) Maintain overhead cranes, jack stands, and lifting devices according to Technical Bulletin (TB) 43-0142 and appropriate HN guidance.
 - (3) Stress the proper use of compressed air and hydraulic equipment as prescribed by OSHA standards (29 CFR 1910.166 through 1910.171).

b. Operators and maintenance personnel will—

(1) Wear hearing-protection devices in areas with high noise levels more than 85 decibels (dBA).

(2) Wear appropriate respirators when required during vehicle maintenance (AR 11-34 and AE Reg 385-7). Engineering controls and procedures will be used when possible instead of respirators. Personnel must be protected from asbestos fiber and toxic gas inhalation when repairing brakes and clutches, painting in enclosed areas, and cleaning.

c. Personnel will—

(1) Not lean on, stand on, or sit under equipment suspended by recovery vehicles, A-frames, jacks, or other overhead lifts. When vehicles are lifted by a crane, A-frame, or wrecker, jack stands must be placed under the vehicle being lifted.

(2) Wear face and eye protection when chipping, cutting, sanding, or welding.

(3) Wear protective clothing when handling batteries.

(4) Use tools only for their intended purpose. Personnel will not use power tools with frayed electrical cords or without proper grounding.

(5) Use motorpool tire cages when inflating tires to protect themselves from exploding, split wheel rims. When using tire cages, personnel will use airhose extensions to ensure they are at least 10 feet from the tire being inflated.

SECTION XIII EXPLOSIVES AND AMMUNITION SAFETY

46. GENERAL

Commanders will—

a. Expose only the minimum number of people and amount of equipment necessary to ammunition and explosives.

b. Instruct personnel to handle ammunition carefully. Containers must not be tumbled, dropped, thrown, rolled, or dragged (unless designed for dragging).

- c. Make provisions to evaluate and, if necessary, segregate damaged ammunition.
- d. Caution personnel not to handle, disassemble, or destroy enemy equipment or ammunition without authorization.
- e. Make certain that ordnance experts carefully examine unknown ammunition stocks before demolition or shipment.
- f. Determine if the area of operations is susceptible to electric storms and establish lightning-protection procedures.
- g. Ensure personnel know not to remove ammunition from its packaging until required. Ammunition containers protect against hazards such as moisture, dirt, and handling.
- h. Encourage personnel to wear leather gloves when working with banding materials or wooden boxes.
- i. Ensure proper protective clothing and equipment is used when handling explosives, pyrotechnics, and ammunition. Leather gloves or other protective clothing may be required when the risk of skin burns is likely.
- j. Prohibit the installation of perimeter defense ammunition items (for example, Claymore mines, trip-flares) at ammunition storage sites, unless specifically authorized by the commander of the appropriate USAREUR major subordinate or tenant command (AE Reg 10-5, app A).
- k. Prohibit horseplay with ammunition, explosives, and pyrotechnics. NCOs will enforce standards for handling these items.
- l. Instruct personnel to handle weapons as if loaded with live ammunition at all times.
- m. Instruct soldiers not to point weapons at anyone and to control and secure their weapons at all times.
- n. Insist that all use of ammunition, explosives, and pyrotechnics be performed according to established procedures for the ammunition, explosive, or pyrotechnic item.
- o. Ensure only approved Army motor vehicles are used to transport ammunition and explosives (app C).

47. FIRE PRECAUTIONS

- a. Do not permit matches; lighters; and other fire-, flame-, or spark-producing devices in areas where ammunition or explosives are located.
- b. Ensure fire extinguishers are present whenever ammunition is handled, stored, or transported.
- c. Prohibit flame-producing emergency signals on vehicles carrying explosives.
- d. Store incendiary devices required for destroying classified material in dry, fire-retardant buildings and rooms that can be locked to prevent tampering.
- e. Instruct personnel not to attempt to fight fires when ammunition is engulfed in flames.
- f. Appendix D provides response procedures for fires involving depleted uranium (staballoy) ammunition.

48. UNEXPLODED ORDNANCE

a. Personnel will not touch, pick up, attempt to disarm, or otherwise disturb any unexploded ordnance, dud ordnance, or any unknown object they find. Personnel who find any of these items will—

(1) Mark the location to warn others and report it immediately to the explosive ordnance disposal (EOD) detachment through their chain of command. When personnel find UXO in training areas, they will report it through the chain of command to the responsible range-control authority.

(2) Notify all units in the area of the unexploded ordnance before EOD personnel destroy it. This will prevent false alarms.

b. Commanders will remind personnel of the following:

(1) Radio transmissions must be made at least 100 meters away from unexploded ordnance.

(2) Some types of ordnance have magnetic or motion-sensitive fuses and will detonate when they detect a target. Other types have self-destruct timers. Personnel will stay away from suspected unexploded ordnance.

49. SMALL ARMS HANDLING

a. Clearing barrels (c below) must be installed at installation entry points, guard dismount areas, and entries to critical areas (such as command headquarters buildings). Clearing procedures must be posted and enforced. Table 3 shows clearing procedures for common weapons. The procedures in table 3 are taken directly from the applicable TMs.

b. Commanders will—

(1) Ensure personnel are proficient in combat identification and rules of engagement.

(2) Establish a weapon lubrication policy.

(3) Require that weapons, ammunition, and magazines are kept clean.

(4) Require that muzzles be covered to prevent clogging.

c. The clearing barrel will be constructed as follows:

(1) The clearing barrel must be a 30-gallon container at least 14 inches wide and 24 inches deep and filled with pea gravel or sand ((2) below). (Pea gravel is loose rounded fragments of rock the size and shape of a pea.) Each clearing barrel must—

(a) Have a ¾-inch piece of plywood or thick rubber mat covering the diameter of the container fitted directly behind the lid to reinforce it against muzzle blast.

(b) Be mounted at a height of 18 to 24 inches and at an angle of 45 degrees to permit safe and smooth firearms clearing.

(c) Have an aiming point in the center of the front lid at least 4 inches in diameter and 1 inch deep.

(d) Have a tray affixed under the aiming point (opening) of the barrel to prevent dropped rounds from falling to the ground.

(e) Have the area below the clearing zone covered by rubber or other resilient material to help prevent loss of or damage to a dropped round. A 36-inch safety zone must be maintained around the clearing barrel.

Table 3
Small Arms Clearing Procedures
<p align="center">M9 Pistol (TM 9-1005-317-10)</p> <p>NOTE: The TM only specifies “unloading the pistol” procedures.</p> <ol style="list-style-type: none"> 1. Place de-cocking/safety lever in “S” (down) position. 2. Depress the magazine release button to remove the magazine from the pistol. 3. With the pistol pointing in a safe direction, grasp the slide serrations and fully retract the slide to remove the chambered cartridge. 4. Lock the slide to the rear using the slide stop and visually inspect chamber to ensure that it is empty.
<p align="center">M16 & M4 (TM 9-1005-319-10)</p> <ol style="list-style-type: none"> 1. Point the weapon in a SAFE DIRECTION. Place selector on SAFE. If weapon is not cocked, lever cannot be pointed toward SAFE. 2. Remove cartridge magazine by depressing magazine catch button and pulling cartridge magazine down. 3. To lock the bolt open, pull charging handle rearward. Press bottom of the bolt catch and allow bolt to move forward until it engages catch. Return charging handle to full forward position. If you haven’t before, place selector level on SAFE. 4. Check receiver and chamber to ensure these areas contain no ammo. 5. With the selector lever pointing toward SAFE, allow bolt to go forward by pressing upper portion of bolt catch.
<p align="center">SAW - M249 (TM 9-1005-201-10)</p> <ol style="list-style-type: none"> 1. Charge weapon (pull cocking handle rearward). Be sure bolt is locked in rear position. Push charging handle forward until you hear it click. 2. Push safety to right (RED BAND not visible). 3. If belt feed is used, squeeze latches to open cover assembly. Remove ammunition belt and loose links. If magazine is used, push down on magazine release tab and pull out magazine. 4. Raise feed tray assembly. Look into chamber. Round still chambered? Remove it using stuck cartridge case or live round procedure. 5. Magazine well/receiver cavity/chamber empty? Lower feed tray assembly. Close cover assembly. Make sure it locks shut. 6. Push safety to left (RED BAND visible). Hold cocking handle to rear, pull trigger, and ride bolt forward to close and lock. 7. Look in receiver cavity for live rounds or spent cartridge cases. With left hand, open magazine well cover by pushing inward, and check for live rounds or spent cartridge cases.

Table 3
Small Arms Clearing Procedures
<p align="center">M240 MACHINEGUN (TM 9-1005-313-10)</p> <ol style="list-style-type: none"> 1. Place safety to "F". 2. Pull charger cable (M240/M240C) or cocking handle assembly (M240B/M240E1/M240G) to rear to lock bolt back. Return cocking handle to forward position (M240B/M240G). 3. Place safety on "S". 4. Push in latches to open cover assembly. 5. Remove ammo belt. 6. Raise feed tray. 7. Look into chamber to make sure it is empty. If a round is still in the chamber, refer to ruptured/stuck cartridge case or live round procedures. 8. Lower feed tray. 9. Place safety to "F". 10. Hold charger cable (M240/M240C) or cocking handle assembly (240B/M240E1/M240G) to rear, depress trigger, and ease bolt forward to close and lock. 11. Close cover assembly. Make sure it locks shut.
<p align="center">M60 MACHINEGUN (TM 9-1005-224-10)</p> <ol style="list-style-type: none"> 1. Point weapon down range. 2. M60 - move safety on "F"/M60D - press in on "F". 3. Pull cocking handle rearward, then push it forward until it locks. 4. M60 - move safety to "S"/M60D - press in on "S". 5. Turn latch lever and open cover. 6. Remove ammunition and link belt and raise feed tray. 7. Eyeball chamber. If empty, go to step 8. If a round is chambered, use procedures for stuck or ruptured cartridge case and troubleshooting. 8. Lower feed tray. 9. Close cover. Cover latch should catch and hold cover closed. 10. M60 - Move safety to "F". Pull cocking handle rearward and hold it. Pull trigger and allow cocking handle to move forward slowly./ M60D - Press in on "F". Pull cocking handle rearward and hold it. Pull trigger and allow cocking handle to move forward slowly.

(f) Have written arms-clearing procedures posted above the clearing barrel for each type of firearm used in the area. If the barrel serves an arms room, the sign must provide information for all firearms stored in the arms room. The print must be large enough to be easily read from inside the clearing zone. The procedures may be printed on flip charts or interchange-able cards. The written clearing procedures must also be in the HN language if HN personnel are expected to use the clearing barrel.

(2) Pea gravel has the greatest stopping ability. If sand is used, it must be free of rocks or other debris. It also must be kept dry, since wet sand can cause ricochets. If the barrel is outdoors, dry sand must be placed in a plastic bag and tied before being placed in the clearing barrel.

50. AMMUNITION, SIMULATORS, PYROTECHNICS, AND CHEMICALS

The use of blank ammunition, simulators, pyrotechnics, and chemicals in training is subject to the following restrictions:

a. Blank Ammunition.

(1) Do not issue both blank and live ammunition to persons participating in the same training exercise.

(2) Direct personnel to secure the blank firing adapter or attachment on the weapon muzzle when firing blank ammunition during force-on-force training.

(3) Forbid personnel from firing small caliber (5.56 millimeter (mm), 7.62 mm, and 50 caliber) blank ammunition within 20 meters of unprotected personnel. This distance may be reduced to 5 meters when exposed personnel are wearing approved eye protection (ballistic laser protective spectacles (B-LPSs)).

b. Simulators. Leaders will instruct their personnel to—

(1) Follow the detailed instructions for use and the safety precautions provided with each simulator.

(2) Observe the minimum safety distances printed on the package or simulator. Hand-held simulators (handgrenade and artillery) will not be detonated within 25 meters of unprotected personnel, vehicles, or buildings (excluding military operations on urbanized terrain (MOUT) facilities).

(3) Not throw simulators directly at people, tents, or vehicles. The fragment-hazard distance for M115A2 simulators is 25 meters. Only designated and authorized personnel may use M115A2 simulators. Personnel in charge of using the device must be thoroughly trained trainers or controllers.

(4) Not place hand-held simulators on armored personnel vehicles. A high surface temperature could ignite simulators.

(5) Guard emplaced booby-trap simulators to prevent people from coming within 2 meters of them. These simulators will not be abandoned.

(6) Not fire M1 tank main-gun simulators (Hoffman device) within 50 meters of people or within 150 meters of buildings (excluding MOUT facilities), aircraft, or flammable materials. The Hoffman device must be

loaded, reloaded, or unloaded with the device in the loading position and the key removed.

(7) Wait at least 30 minutes after the expected detonation time before investigating the reason for a misfire. Simulators that fail to function are extremely dangerous.

(8) Never open a simulator or attempt to burn the contents.

c. Pyrotechnics. Leaders will—

(1) Ensure personnel know that simulator flash powder ignites instantly and explosively and that simulators should not be exposed to intense heat or direct sunlight.

(2) Remind personnel never to cut open or hand-ignite these devices and to mark duds and seek EOD guidance for handling and disposal.

(3) Tell personnel not to throw or detonate simulators, flares, or smoke devices near troops, tents, vehicles, or other flammable or combustible materials.

(4) Instruct personnel to roll down sleeves and wear gloves and helmets when using simulators.

(5) Remind personnel that pyrotechnics will be used only for their designed purpose.

(6) Prohibit personnel from firing signal flares at people, tents, vehicles, or aircraft.

(7) Instruct personnel not to arm hand-held pyrotechnics before use.

(8) Clear all flammable materials from around trip-flare firing positions to prevent accidental fires.

(9) Have personnel guard emplaced trip-flares to prevent anyone from coming within 2 meters of them. These flares will not be abandoned.

d. Duds and Discarded Munitions. OICs will—

(1) Collect unused munitions before soldiers leave the area. Possession of blank ammunition, simulators, or pyrotechnics is prohibited in billets and workareas.

(2) Instruct soldiers not to touch or move duds or discarded munitions. Locations of duds will be reported through the chain of command. The supporting EOD unit will be called for support.

e. Chemicals. The use of chemicals authorized for training and operational purposes is subject to the following guidance:

(1) The same protective cover and boundary limits observed during training with high-explosive ammunition (AR 385-63 and USAREUR Suppl 1) are required to protect against fragments and ricochet of chemical ammunitions.

(2) Commanders will consult school-trained nuclear, biological, and chemical (NBC) officers or NCOs before using chemical training agents.

(3) Training with chemicals in USAREUR will be restricted to U.S.-controlled training areas and mask-confidence chambers.

(4) When using chemicals, commanders will consider wind and other meteorological conditions, distance factors, and the quantity of munitions to be used. Commanders will—

(a) Coordinate properly with other units and local or regional authorities (for example, county administrator, mayor, military or local police, forestry official).

(b) Take precautions to ensure the civilian population will not be affected.

(5) Before releasing chemical agents in an open area, the commander will—

(a) Inspect the area to ensure the agent will affect only targeted personnel.

(b) Check meteorological conditions to prevent the chemical agents from spreading off the training area.

(c) Warn personnel and units in the area who are not involved in the training before chemicals are used.

(6) The commander of personnel taking part in chemical training will get a medical clearance for persons whose health or physical profile indicates participation may result in injuries. As a minimum, persons with a P3 profile because of respiratory or cardiac conditions will be evaluated at a medical facility before engaging in training involving chemical agents.

(7) A school-trained NBC officer or NCO will supervise mask-confidence training. During mask-confidence exercises, medical personnel trained in emergency care of chemical casualties and a vehicle for emergency evacuation must be present.

(8) Firing projectiles or dropping bombs containing chemicals that may be harmful to the environment or wildlife on land or in water is prohibited during training.

(9) At major training areas (MTAs), the Commander, Seventh Army Training Command, will determine the safe distance for using chemicals.

(10) Chemicals listed in applicable FMs may be used to train personnel to detect and identify toxic chemicals. Chemical training agents, such as banana oil, may be used in mask-confidence training to eliminate the irritation of riot-control agents (such as 0-chlorobenzalmalonirite (CS)).

f. Riot-Control Agents. Commanders using CS riot-control agents will observe the following restrictions:

(1) In USAREUR areas of operation, use of CS riot-control agents will meet environmental restrictions in AR 200-1 and UR 200-1. CS damages foliage and remains in the soil, harming germination.

(2) CS agents will be used only under the supervision of a school-trained NBC officer or NCO.

(3) CS agents may be used in open training areas if the agent source is at least 500 meters from the nearest community, road, or highway.

(4) These agents will be used far enough away from nontargeted roads and inhabited areas that a change of wind direction will not carry the chemicals into these areas.

(5) In densely wooded areas and on cool, cloudy days, the minimum releasing distance from the nearest non-targeted community, road, or highway is 1,000 meters.

(6) During demonstrations, CS riot-control agents will not be released within 50 meters of spectators located upwind.

(7) When conducting CS training in the open, no more than two grenades will be used at once. Additional grenades will not be ignited until previously detonated grenades have stopped functioning.

(8) Large CS dispensers (such as CS-1 drums) will not be used in USAREUR areas of operation for training.

(9) Only CS in capsule form will be used in CS chambers.

(10) The protective mask and field clothing, with collar and cuffs buttoned and trouser legs tucked into combat boots, will be worn to protect against field concentrations of CS.

(11) Personnel contaminated by CS should be—

(a) Placed in fresh air, facing into the wind, for 5 to 10 minutes.

(b) Placed away from other contaminated personnel.

(c) Instructed to avoid rubbing their eyes.

(12) If major accidental CS contamination occurs, soldiers will be decontaminated as follows:

(a) Promptly flush bodies with large amounts of water.

(b) Wash the body, while protecting the eyes, with a 5-percent sodium bisulphate solution to remove the CS agent. If sodium bisulphate is not available, a 1-percent solution of sodium carbonate, sodium bicarbonate, or soap and water may be used.

(c) For showering after exposure to CS, flush the soldier's body with water for 3 to 5 minutes before normal showering. If agent residue is on the clothing, remove the clothing to prevent unmasked personnel from being contaminated.

g. Smoke. Smoke is toxic, and prolonged exposure to it can be fatal. The following apply to use of smoke:

(1) White and red phosphorous smoke will not be used for training in USAREUR areas of operation.

(2) Commanders of units planning to use smoke-producing munitions or devices, except for colored signaling smoke, will notify other nearby units.

(3) When using smoke, commanders will ensure appropriate protection is provided to people who are likely to be exposed.

(4) Specific consideration must be given to weather conditions and the potential downwind effects of the smoke.

(5) Before scheduling smoke operations in the general area of major highways, railways, or water-traffic arteries, commanders will—

(a) Coordinate with local authorities for clearance.

(b) Ensure precautions are taken to reduce interference with traffic.

(c) Post patrols, guards, and warning signs, as necessary during training, to give adequate warning to persons in the area.

(6) Soldiers will carry protective masks when participating in exercises that include smoke.

(7) Soldiers will put on masks before being exposed to high concentrations of smoke produced by white smoke grenades, smoke pots (hexachloroethane (HC) smoke), or metallic powder, and when—

(a) Passing through or operating in dense smoke (visibility less than 50 meters), such as smoke blankets and smoke curtains.

(b) Operating in or passing through a smoke haze (visibility greater than 50 meters) when the exposure will last more than 4 hours.

(c) Exposure to smoke produces breathing difficulty, eye irritation, or discomfort. Such effects on one person will serve as a signal for all similarly exposed personnel to put on masks.

(d) Conducting MOUT training in enclosed spaces. The protective mask is not effective in oxygen-deficient atmospheres. Soldiers will be careful not to enter confined space where oxygen may have been displaced by smoke.

(e) Operating smoke-generator equipment if the operator cannot be positioned upwind from smoke being generated.

(8) The following precautions must be observed when using HC smokepots:

(a) HC smokepots must be kept dry before use. Wet smokepots may burn erratically, explode, or produce spontaneous combustion.

(b) The firer will be trained to keep his or her face turned away from the smokepot as much as possible during manual firing and to move quickly at least 30 meters from the smokepot after ignition. Because HC smokepots produce great heat when burning, operators will take precautions to prevent fires.

(c) HC smokepots will not be fired inside buildings, tents, or other enclosed areas because of fire and health hazards from the fumes.

(9) When grenades are used in training, care must be taken to prevent grass and forest fires.

(10) Grenades will not be activated during training within 10 meters of people and will not be used for mask-confidence exercises or in confined areas or tents.

h. Aircraft Sprays.

(1) A portable helicopter disperser may be used to spray CS or chloroacetophenone (CN) in MTAs.

(2) When agents are sprayed from low-flying Army aircraft, permanent injury to unprotected eyes and severe irritation of the skin of exposed personnel may occur. To prevent injuries, the following precautions must be taken:

(a) Soldiers will be instructed not to look up unless their eyes are protected when planes are directly overhead or upwind.

(b) Soldiers contaminated with liquid in a spray attack will remove clothing as soon as possible and go to shower or washing facilities. Contaminated eyes should be washed immediately with fresh water.

(3) Aircraft-spraying operations will not be conducted within 1 kilometer of non-targeted buildings, equipment, or nonparticipating soldiers.

51. VEHICLE REQUIREMENTS

a. Vehicles Transporting Explosives and Ammunition. AE Regulation 55-4 provides specific requirements for vehicles transporting explosives and ammunition.

(1) The following loading precautions must be observed:

(a) Vehicle brakes must be set, the engine must be turned off, and at least two wheels must be chocked during loading and unloading.

(b) Ammunition weight must be evenly distributed and the load must be secured to prevent movement.

(c) Vehicles and trailers loaded with ammunition must be parked at least 50 feet away from vehicles and trailers loaded with flammable liquids.

(2) Appendix C lists Army motor vehicles and trailers that may be used to transport ammunition and explosives.

(3) Drivers of vehicles loaded with ammunition or explosives, regardless of the type or quantity of explosives, will be trained, licensed, and issued an *ADR* certificate according to AE Regulation 55-4.

(4) Built-up vehicles not manufactured to military specifications (for example, trucks or trailers with exterior shelters installed locally) must not transport ammunition or explosives.

(5) Vehicle electric systems will not exceed 24 volts.

(6) When transporting hazard classes of ammunition, two metal reflecting orange plates (NSN 9905-01-V40-0650) and two placard frames (NSN 9999-01-V40-0653) must be affixed to the front and rear of each vehicle. The plates should be attached so that they are no higher than 5 feet above road level. Diamond placards will be placed on both sides and on the rear of the vehicle as prescribed in AE Regulation 55-4.

(7) Plates and placards are not required when transporting items of hazard class 1.4S (AE Reg 55-4) (for example, small arms).

(8) Trailers used to carry ammunition or explosives must be equipped with either—

(a) Brakes that may be operated from the drivers cab.

(b) Automatic brakes that lock when the trailer is detached from the towing vehicle.

(9) Only one trailer will be towed at a time. Two-wheeled trailers must be equipped with a rear support leg.

(10) Vehicles must have a loading compartment with secure sides that are high enough and strong enough to carry the load safely. The floor must not have openings. The floor and sides must be clean and free of protruding nails and other sharp objects. Vehicles must not have operational deficiencies that could cause a brake, steering, or lighting failure.

(11) Before using vehicles, drivers will ensure—

(a) There are no deficiencies in the lighting or electric system.

(b) There are no leaks in the fuel (carburetor, line, pump, tank), oil, or exhaust systems.

(c) Daily preventive maintenance checks and services inspections and DD Form 626 are completed.

(12) The following documents must be carried in vehicles transporting ammunition or explosives:

(a) DD Form 626.

(b) DD Form 1348, DD Form 1348-1A, DA Form 581, or other document with information required by AE Regulation 55-4 to serve as a transportation document.

(c) The HAZMAT Vehicle Classification documentation (AE Reg 55-4).

(d) The appropriate accident information sheets and, if applicable, the supplemental accident information sheets, describing hazard divisions and required safety measures. These forms must be in English and the language of all countries traveled through. AE Regulation 55-4 has instructions on downloading accident information sheets from the Internet.

(e) Authorized route (stripmap) is recommended except where mandatory routing is required by AE Regulation 55-4 or the HN.

(f) Emergency telephone numbers (may be listed on accident information sheets).

b. Equipment Requirements. The following equipment is required for each vehicle transporting explosives or ammunition:

(1) One 5-pound 10 BC or 2-kilogram BC fire extinguisher mounted on the vehicle for engine and cab fires and a 6-kilogram BC fire extinguisher for tires, brakes, and dangerous cargo.

(2) Two warning triangles or other warning devices as allowed by HN law.

(3) Two pairs of wheel chockblocks for each vehicle.

(4) Reflector vests for each vehicle crewmember.

(5) Emergency environmental-protection and personal-protection equipment specified on the accident information sheet and, if required supplemental accident information sheets.

c. Wheel Chains on Vehicles Transporting Ammunition or Explosives at USAREUR MTAs. Wheeled vehicles must have nonsparking wheel chains on board from 1 November through 30 April when picking up ammunition or explosives. Chains also must be installed on wheels—

(1) When road conditions are amber because of snow or ice.

(2) When advised by movement-control or range-control personnel.

(3) According to the appropriate vehicle operators manual.

52. AMMUNITION- AND EXPLOSIVES-LOADING COMPATIBILITY

a. Markings on individual packages or items approved by the U.S. Army and normally used in the United States are valid in Europe.

b. Ammunition and explosives will not be combined for movement with any other hazardous material except as permitted in AE Regulation 55-4 for 1.4S items.

c. AE Regulation 55-4 provides specific information on compatibility of items. Generally, loading is limited to materials within the same compatibility group.

53. LOAD STABILITY

a. Loads must be blocked and braced according to approved loading plans and diagrams to prevent movement during transport.

b. Piling loads higher than the tops of the sideboards or tailboards is prohibited.

c. Electro-explosive devices and ammunition containing electro-explosive devices may be transported only in original packaging or in closed, metal, small-arms containers to protect against initiation by electromagnetic radiation hazards.

54. SAFETY IN TRANSIT

a. Except in convoys, the minimum vehicle crew must consist of a driver and an assistant driver. For convoys, the first and last vehicle must have a driver and an assistant driver. Both crewmembers must be licensed for the vehicle and possess a valid *ADR* card.

b. Vehicle drivers should avoid densely populated areas when transporting ammunition.

c. Commanders will ensure unauthorized persons and persons suspected to be under the influence of drugs or alcohol do not approach or handle ammunition or explosives.

d. No person will be allowed to ride on or in the cargo compartment of a motor vehicle transporting ammunition or explosives.

e. Vehicle operators will obey local traffic laws and drive safely, based on road and weather conditions. Vehicles must not exceed 60 kph (37 mph) on normal roads and 80 kph (50 mph) on highways.

f. The distance between vehicles transporting ammunition and explosives should be at least 50 meters. Convoy commanders may order the distance between vehicles reduced in special circumstances.

g. Stops should be made—

(1) Approximately every 2 hours to check the stability and security of a load, and to allow drivers to rest.

(2) At least 300 meters from inhabited buildings and places of assembly. These stops will be made only where they are not hazardous to other vehicles.

h. Temporary parking restrictions apply to vehicles transporting explosives and ammunition. These restrictions do not apply to overnight parking or download sites.

(1) There must be at least 50 meters between parked vehicles carrying ammunition and explosives.

(2) Drivers will not leave vehicles unattended (AE Reg 55-4). Commanders will check to ensure safety and security requirements in AE Regulation 55-4 are followed.

(3) Commanders will not allow smoking, fire, or open flames within 50 feet of vehicles.

(4) Portable warning devices, such as warning triangles, should be placed about 100 meters in front of and behind stopped vehicles during darkness and bad weather. RAWLs must be used when available.

i. If a vehicle transporting ammunition or explosives breaks down or is involved in an accident, operators will—

(1) Follow the instructions in the applicable accident information sheet.

(2) Warn traffic by placing warning devices 100 meters in front of and behind the vehicle. If on an expressway or a four-lane divided highway, operators will place both triangles to the rear at least 200 and 300 meters, respectively. Distance may vary, depending on conditions.

(3) Move the vehicle to a safe area away from traffic lanes and at least 300 meters from inhabited buildings.

(4) Notify local HN police for assistance.

(5) Not perform major repairs until the load has been transferred to a relief vehicle.

(6) Contact the appropriate HN authority or commander of the unit nearest the operator's unit for a relief vehicle and work party if required.

(7) Make minor repairs if there is no risk of fire or other hazard.

55. STORAGE PRECAUTIONS

a. All locations used for the storage of ammunition for more than 48-hours must be licensed according to AR 385-64; DA Pamphlet 385-64, chapter 5 or 14; and UR 385-64. This includes arms rooms.

b. During field storage, ammunition must be protected from direct sunlight, particularly unpackaged ammunition. Because tarpaulins or other covers placed directly on ammunition can cause deterioration, a ventilation space must be provided.

c. During field storage, disperse ammunition to be used to minimize loss in case event of fire, accidental explosion, or enemy action.

d. When storing ammunition in the field, use terrain, barriers, buildings, and other appropriate barriers to prevent propagation and to protect personnel and material from the effects of an explosion.

e. The safe separation distance (quantity-distance) standards for storage of ammunition and explosives in AR 385-64, DA Pamphlet 385-64, and UR 385-64 must be followed. Table 4 shows and explains safe separation distances.

f. Captured ammunition and ammunition of unknown origin must be examined, evaluated, and classified by qualified personnel and stored in a designated collection point separate from other ammunition (when possible).

Amount of Explosives	D1	D2	D3	D4	D5	D6
Kgs	M	M	M	M	M	M
5	1	4	8	180	270	20
10	2	5	10	180	270	20
20	2	7	13	180	270	20
30	2	7	15	180	270	20

Table 4 Safe Separation Distances						
Amount of Explosives	D1	D2	D3	D4	D5	D6
Kgs	M	M	M	M	M	M
40	3	8	16	180	270	20
50	3	9	18	180	270	20
60	3	9	19	180	270	26
75	3	10	20	180	270	26
100	4	11	22	180	270	32
125	4	12	24	180	270	38
150	4	13	26	180	270	42
175	4	13	27	180	270	
200	5	14	28	180	270	
225	5	15	29	180	270	
250	5	15	30	180	270	
275	5	16	31	180	270	
300	5	16	32	180	270	
350	6	17	34	180	270	
400	6	18	35	180	270	
450	6	18	37	180	270	
500	6	19	38	180	270	
600	7	20	40	180	270	
700	7	21	43	180	270	
800	7	22	45	180	270	
900	8	23	46	180	270	
1000	8	24	48	180	270	
1100	8	25	50	180	270	
1200	9	26	51	180	270	
1300	9	26	52	180	270	
1400	9	27	54	180	270	
1500	9	27	55	180	270	
1600	9	28	56	180	270	
1800	10	29	58	180	270	
2000	10	30	60	180	270	
2500	11	33	65	180	270	
3000	12	35	69	200	305	
3500	12	36	73	215	330	
4000	13	38	76	230	350	
D1=0.8Q ^{1/3} D2=2.4Q ^{1/3} D3=4.8Q ^{1/3} D4=3.6Q ^{1/2} D5=5.5Q ^{1/2}						

Table 4					
Safe Separation Distances					
NOTES: 1. QD separations:					
a. Column D1 is used for—					
(1) Side-to-side, side-to-rear, and rear-to-rear exposures between undefined earth-covered magazines, and the explosives are stored at least 1 meter (3 feet) from the end of the shelter.					
(2) Nonarmored sites to nonarmored sites when an adequate barricade is located between the sites.					
(3) Light armored vehicles to nonarmored explosives sites when an adequate barricade is near the nonarmored explosive site.					
(4) Light armor or nonarmored potential explosives sites to light armored explosives sites when an adequate barricade is located between the sites.					
b. Column D2 is used for—					
(1) Front-to-front exposures involving undefined earth covered magazines when there is an adequate barricade at the explosives sites.					
(2) Nonarmored or light armored sites to the side or rear of an undefined earth covered magazine.					
c. Column D3 is used for—					
(1) Nonarmored sites to nonarmored sites without an adequate barricade.					
(2) Light armored vehicles to nonarmored sites without an adequate barricade at the nonarmored site.					
(3) Undefined earth covered magazines to undefined earth covered magazines when positioned front-to-front and no barricade is present.					
(4) Nonarmored sites, light armored sites or undefined earth covered magazines to the front of undefined earth covered magazines when no barricade is present at the explosives site.					
d. Column D4 is used for public traffic route (PTR) separations from nonarmored and light armored vehicles and sites.					
e. Column D5 is the inhabited building distance (IBD) separation from non-armored and light armored vehicles or sites.					
f. Column D6 is used to determine the IBD and PTR separation from heavy armored vehicles. When NEQ exceeds 150 kg (330 lb) the IBD and PTR separation distances specified in columns D4 and D5 apply.					
2. Heavy armored vehicles are expected to largely contain the blast and fragments from an internal explosion and are well protected from an external explosion. For this reason there is no required separation from heavy armor to light or non-armored sites. Additionally, heavy armor requires no separation from other sites (heavy armor being the explosives site). The hatches of heavy armored vehicles must be kept closed to consider them as heavy armor.					
3. The QD requirements for light and nonarmored vehicles or sites are:					
TO➡	Heavy	Light	Nonarmored	PTR	IBD
From Light	NR	D1	D3	D4	D5
From Nonarmored	NR	D1	D3	D4	D5

Table 4 Safe Separation Distances
4. Use $D=9.5Q^{1/3}/D=12Q^{1/3}$ (K24/30) instead of D1, D2 and D3 for asset preservation.
5. The total NEQ/NEW of ammunition in all trucks or trailers within a truck or trailer park will be used for QD computations if the trucks or trailers within a park occupy one storage site and are not separated from each other by QD specified in 2 above.
6. Inter magazine separation requirements of DA Pamphlet 385-64, chapter 5, apply when basic load ammunition is stored in standard magazines. When earth covered shelters of light construction (for example, a MILVAN covered with dirt, are used) the D1 distances apply to side-to-side configurations with earth cover, and the explosives are stored at least 1 meter from the end of the shelter. If end-to-end sitings are involved, the D2 distances apply provided there is a barricade. D3 distances apply if there is no barricade.
7. The Bradley Fighting Vehicle is expected to contain blast and fragments from its HD 1.2, 25mm ammunition. If a Bradley is uploaded only with 25 mm ammunition it can be considered as "heavy armor." If a Bradley is only uploaded with 25mm ammunition it can be consider as "heavy armor."
8. Barracks, headquarters, and maintenance facilities within a military installation will be separated from mixed compatibility, basic load ammunition of less than 4,000 kg NEQ/8,820 pounds NEW by D5 distances.

**SECTION XIV
BIVOUAC ACCIDENT AND INJURY PREVENTION**

56. SITE REQUIREMENTS

a. Assessments. The following will be assessed before being occupied:

(1) Bivouac Sites. Bivouac sites must be free of hazards (for example, dangerous animals, debris, large and sharp rocks, poisonous plants). Safety officers will check bivouac areas for high-voltage lines before laying wire or erecting antennas and bridges.

(2) Parking Areas. A natural or artificial barrier will exist or be constructed between parking areas and tent areas. Vehicles must be parked so they will not roll into sleeping areas or mess facilities. Vehicle parking areas must be located at least 15 meters from sleeping areas.

(3) POL Storage Areas. The POL storage area must be located at least 50 feet from and at an elevation equal to or lower than bivouac areas.

b. Blackouts. A complete blackout of vehicles in bivouac areas is prohibited during tactical exercises. Isolated blackout movements in bivouac areas may be authorized when a ground guide precedes with a

flashlight. Vehicle drivers will comply with flashlight, arm, and hand signals given by ground guides.

c. Sleeping Areas. Commanders will—

(1) Designate and mark sleeping areas with white engineer tape. When sleeping areas are around the perimeter of the bivouac area and it is not practical to mark sleeping areas with white engineer tape, commanders will place extra emphasis on keeping vehicles away from the perimeter.

(2) Ensure sleeping areas are barricaded, not set up in old riverbeds, and are away from roads and vehicle trails when possible.

(3) Not permit soldiers to sleep—

(a) Immediately in front of, behind, or under wheeled or tracked vehicles.

(b) In vehicles with engines running.

(4) Encourage soldiers to sleep next to natural barriers (for example, trees) within command-designated sleeping areas. Soldiers will sleep in safe places when in areas without natural barriers.

(5) Ensure guards challenge vehicles to halt at bivouac perimeters and have people dismount from vehicles before entering assembly or bivouac areas.

(6) Ensure vehicles pass through assembly or bivouac areas only when absolutely necessary. To move through assembly or bivouac areas or areas where troops may be present, drivers will have ground guides. There must be 10 yards between vehicles and ground guides. Ground guides must be trained in the arm-and-hand signals in FM 21-60 and their soldier's manuals.

(7) Ensure walking guards are posted and carry working flashlights after dark. Commanders will brief walking guards on their duties.

d. Latrines. Bivouac latrines must be located—

(1) At a lower elevation than the camp.

(2) At least 90 meters from the unit mess facility and 28 meters from the nearest water source.

57. GENERAL SAFETY RULES

a. Antennas. Antenna-tip caps (NSN 5985-00-930-7223) or other suitable protective items must be placed on OE-254 and RC-292 antenna elements. Only authorized mast assemblies will be used with antennas. Camouflage poles will not be used with either the OE-254 or the RC-292. Soldiers will inspect the mast section for cracks before assembly. If the antenna mast is lowered and left unattended on the ground, the elements must be removed. Soldiers will wear a helmet, protective goggles, and gloves setting up and dismantling antennas.

b. Electrical Equipment. Electric generators and equipment (for example, signal vans) must be grounded and positioned at least 150 meters (488 feet) from sleeping areas and tents due to potential lightning strikes. The Surface Wire Grounding System (Grounding Kit, MI-2551A/U, NSN 5820-01-263-1760) is an alternative grounding system designed for use with systems requiring high mobility and quick installation and tear-down capabilities. Generator outriggers will be extended after the generator is placed in the desired position.

c. Tent Pins. Tent pins originally issued in a color (for example, orange) will not be repainted in subdued colors.

d. Passengers. Soldiers will—

(1) Sit when riding on truck beds to avoid being struck by branches, trees, or wires.

(2) Not ride on vehicle running boards or jump off moving vehicles.

(3) Not get out of vehicle cargo areas when the tailgates are up.

e. Drivers. Drivers will—

(1) Fasten restraining straps across vehicle tailgates before leaving.

(2) Use chockblocks (para 7p).

(3) Not park vehicles uphill from bivouac or sleeping areas.

SECTION XV ACCIDENT REPORTING AND INVESTIGATION

58. REPORTS

The primary purpose of accident investigation and reporting is to prevent accidents. This means that safety reports of accidents will not be used for disciplinary or liability purposes (AR 385-40, para 1-5). Military or civilian police officials will initially estimate Army and civilian damages and include the damage estimates in official police reports. Army unit-maintenance personnel will inspect vehicles to determine actual damage.

59. ACCIDENT TYPES

An Army accident is defined as “an unplanned event, or series of events, that results in injury or illness to either Army or non-Army personnel, or damage to Army or non-Army property as a direct result of Army operations (caused by the Army), or both.” A recordable accident (over \$2,000 damage to Army property or a workday lost by Army personnel) when there is no degree of fault by the Army (military or civilian) will be reported and recorded according to AR 385-40, DA Pamphlet 385-40, and UR 385-40.

a. All accidents will be reported to the USAREUR Safety and Occupational Health Office. Classes of Army accidents are as follows:

(1) Class A Accident: An accident in which the resulting total cost of property damage is \$1,000,000 or more; an Army aircraft or missile is destroyed, missing, or abandoned; or an injury or occupational illness results in a fatality or permanent total disability.

(2) Class B Accident: An accident in which the resulting total cost of property damage is \$200,000 or more, but less than \$1,000,000; an injury or occupational illness results in permanent partial disability; or when three or more personnel are hospitalized as the result of a single occurrence.

(3) Class C Accident: An accident in which the resulting total cost of property damage is \$20,000 or more, but less than \$200,000; a nonfatal injury causes loss of time from work beyond the day or shift on which it occurred; or a nonfatal occupational illness causes loss of time from work (for example, 1 workday) or disability at any time (lost time case).

(4) Class D Accident: An accident in which the resulting total cost of property damage is \$2,000 or more, but less than \$20,000.

b. Commanders will notify the unit safety office as soon as possible but not later than—

- (1) Four hours after a class A or B ground accident.
- (2) Four hours after a class A, B, or C aviation accident.
- (3) Twenty-four hours after a class C or D ground accident.
- (4) Twenty-four hours after a class D or E aviation accident.

c. Unit safety officers will notify the USAREUR Safety and Occupational Health Office (DSN 370-8084), who will notify the United States Army Safety Center. Preliminary notification of ground accidents will be made using DA Form 7305-R or DA Form 7306-R. AR 385-40 provides the forms and instructions for completing them.

60. ACCIDENT INVESTIGATION PROCEDURES

Class A and B accidents will be investigated using the procedures in AR 385-40, DA Pamphlet 385-40, and UR 385-40.

a. On-Duty Accidents. Class A and B on-duty ground and class A through C aviation accidents will be reported immediately through command channels to the USAREUR Safety and Occupational Health Office. The USAREUR Safety and Occupational Health Office will notify the United States Army Safety Center. The unit chain of command will also provide an information copy of the accident report to the unit's major Army command, if different from USAREUR.

b. Accident Boards.

(1) Accident boards should be appointed and briefed within 24 hours after an accident. Boards will be made up according to AR 385-40, chapter 4. The following have appointing authority for on-duty class A and B ground and class A through C aviation accident boards:

- (a) V Corps.
- (b) 21st Theater Support Command.
- (c) United States Army Southern European Task Force.
- (d) Seventh Army Training Command.

(e) Area support groups (ASGs).

(f) Task-force organizations operating in USAREUR areas.

(2) The approving authority for on-duty class A and B ground and class A through C aviation accident-board reports will be the appointing authority. The USAREUR Safety and Occupational Health Office, however, will be the approving authority for reports board from appointed by ASGs and task forces not having general courts-martial convening authority.

(3) An administrative review to ensure compliance with DA Pamphlet 385-40 will be completed by the safety office of the appointing authority before chain-of-command review for accidents not investigated by United States Army Safety Command boards.

(4) A civilian safety specialist (GS-018 or GS-803) will be appointed to ground-accident investigation boards as an adviser. If there are no GS-018 or 803 personnel available, an aviation safety officer or a unit safety officer or NCO who has completed the Safety Officer/NCO Course (SOC 40) will be appointed. An aviation safety officer (military or civilian) will be appointed to accident-investigation boards for class A through C aviation accidents.

(5) HN authorities (military or civilian) may be required under the Status of Forces Agreement or by standardization agreements (STANAGs) to participate in Army accident investigations as nonvoting members. After initial notification, the USAREUR Safety and Occupational Health Office will coordinate HN participation.

(6) For on-duty class A and other selected accidents, accident-board presidents will present an initial briefing to the CG, USAREUR/7A, or a designated representative, within 30 days of the accident date. The USAREUR Safety and Occupational Health Office (DSN 370-8084), will coordinate the date and time of the briefing.

(7) On-duty class A and B accidents involving DA civilian or local national (LN) employees directly employed by the U.S. Army (excluding contractor personnel) will be investigated using the same criteria as on-duty class A and B accidents involving military personnel. Accident-board reports will also be completed using the same criteria as accident-board reports involving military personnel. The only difference to this is that the appropriate Department of Labor or LN accident report form will replace the DA Form 285 in the report.

c. Off-Duty Accidents. Off-duty class A and B accidents will be reported according to AR 385-40. After every privately owned vehicle (POV) accident that results in death or serious injury, commanders will—

(1) Conduct an assessment of the accident with the involved soldier's chain of command.

(2) Determine what happened and how it could have been prevented.

(3) Implement corrective and preventive measures.

(4) Publicize lessons learned.

(5) Send a copy of the assessment ((1) above) through the chain of command to the USAREUR Safety and Occupational Health Office. The DA Form 285-AB-R, block 39, will include three additional paragraphs (preaccident phase, accident phase, and post-accident phase) according to DA Pamphlet 385-40.

d. AGAR. The AGAR (DA Form 285-AB-12) system is used to document recordable class C and D ground accidents. An information copy of completed accident reports must be sent through command channels to the USAREUR Safety and Occupational Health Office.

e. Biochemical Testing. Biochemical (blood and urine) testing must be performed on all personnel involved in, or contributing to, class A, B, or C aviation accidents, and on-duty class A or B ground accidents. Collection, marking, packing, shipment, and analysis procedures are prescribed by DA Pamphlet 385-40. The following specimens will be collected according to AR 40-21:

(1) Serum: 15 to 20 milliliters (no preservatives) (unhemolyzed).

(2) Blood: 15 to 20 milliliters (sodium fluoride or ethylenediamine tetraacetic acid).

(3) Urine: 50 milliliters (optimum) (no preservatives).

f. Accidents Involving Other National Military Forces. The following guidance applies to accidents or incidents involving U.S. equipment, facilities, or personnel and those of other national military forces. All appointing and approving authorities and reporting requirements (b above) remain the same.

(1) U.S. Army commanders in separate United Nations (U.N.) or NATO organizations or facilities will—

(a) Develop procedures for notifying the appropriate agencies of other countries involved in accidents.

(b) Safeguard wreckage in an undisturbed condition and ask LN authorities to help secure the scene of the accident until the proper safety accident-investigation board completes the field investigation. If the wreckage must be moved, documentation of the site must be made using photographs, drawings, maps, or diagrams.

(2) Non-U.S. members may be invited, when appropriate, to participate in Army accident investigations as nonvoting members. If equipment, facilities, or personnel of any other member nation caused or contributed to the accident, that nation's authorities will be notified and invited to take part in the investigation as a nonvoting member.

(3) Distribution of accident information to non-U.S. NATO members must be according to STANAG 3101 and approved by the United States Army Safety Center.

SECTION XVI PREACCIDENT PLAN

61. GUIDE TO PREACCIDENT PLAN

The unit commander will establish and implement the preaccident plan. The information in this section is not all-inclusive or restrictive. Unit commanders will decide what additional information needs to be in their preaccident plans.

a. Unit personnel will be—

(1) Familiar with the accident reporting provisions of AR 385-40.

(2) Aware of the requirement to report all accidents to the unit safety officer or NCO.

b. The safety officer or NCO will have a written preaccident plan that explains what to do (for example, chain-of-command notification, emergency-response-team actions) in case of an accident.

c. Each unit will develop and publish a field tactical preaccident plan that includes specific procedures to follow in case of an accident. The plan must include—

(1) Information for using HN telephone lines to speed up notifying rescue, aeromedical evacuation, and chain-of-command personnel.

(2) The locations of the nearest military and civilian medical treatment facilities (MTFs) and fire departments.

(3) The locations and means of notifying medical personnel.

(4) Training for field-site rescue personnel.

(5) Identification of unit personnel who speak the HN language.

(6) Accident-site security.

62. PRIMARY NOTIFICATION

a. The person who first becomes aware of an accident will complete lifesaving steps, and then report the accident to the victim's unit.

b. The unit safety officer or NCO will—

(1) Notify the chain of command.

(2) Determine the initial classification of the accident (para 59a).

c. The victim's unit will notify the following when appropriate:

(1) Military police.

(2) Medical personnel.

(3) Fire department.

(4) Local authorities.

d. The victim's unit will secure the accident scene when the accident site is released by local police.

63. SECONDARY NOTIFICATION

The victim's unit will notify the following when necessary:

a. Chaplain, if needed (for notifying the next of kin).

- b. Unit maintenance personnel.
- c. Battalion- or higher-level safety personnel for investigation assistance if required (on-duty class A and B accidents).
- d. Public affairs office.
- e. Adjutant.

**SECTION XVII
MEDICAL AND HEALTH CARE**

64. ARMY MEDICAL SUPPORT

a. The Command Surgeon, USAREUR, will determine procedures for treating and hospitalizing participants in joint field exercises. Local medical personnel of participating units will help U.S. Army personnel treat participants of joint operations.

b. U.S. Army fixed treatment facilities and field hospitals established for joint exercises can provide care that is beyond the capability of medical units at field sites.

65. MEDEVAC

a. Ground ambulances will be used to evacuate patients from field medical units. Operation orders must include the location of MEDEVAC units. Ambulance drivers will—

- (1) Comply with Army and HN traffic laws.
- (2) Reduce ambulance speed when required by the medical condition of a patient or driving conditions.
- (3) Use vehicle lights and emergency flashers only when transporting patients or responding to an emergency dispatch.

b. Evacuation by Army air ambulance will be requested only when a patient's condition prevents using a ground ambulance. A competent medical authority at the field medical unit will decide when using an Army air ambulance is appropriate.

c. Unit commanders will—

(1) Immediately report personnel injured or evacuated to a fixed Army or civilian facility for medical treatment to the unit adjutant or G1.

(2) Include in the report ((1) above) the condition of each patient admitted to an MTF.

(3) Notify the unit safety officer or NCO when people are injured in accidents or fires.

(4) Ensure patients do not take individual or unit weapons to MTFs.

(5) Ensure leaders or their designated representatives secure weapons before a MEDEVAC.

d. MTF commanders will immediately inventory, secure, and transfer weapons to a patient's unit commander if the weapons arrive at the MTF.

66. CIVILIAN MEDICAL SUPPORT

a. HN agreements allow U.S. Forces engaged in joint operations to use local MTFs. These agreements apply only when necessary medical support cannot be provided by unit, field, or U.S. Army fixed MTFs.

b. The injured soldier or a fellow soldier will inform the unit chain of command when HN facility provide medical treatment or care.

c. Unit commanders will notify the nearest U.S. Army fixed MTF when an assigned soldier has been hospitalized at an HN medical facility. Medical personnel and unit commanders will make arrangements to transfer the patient to a U.S. Army MTF as soon as possible.

d. Personnel may request emergency medical assistance in most HNs by telephone on highways and in residential areas as follows:

(1) Orange emergency callboxes (*Notruf*) are located every 2 kilometers along autobahns and autostradas and may be used as follows:

(a) Pull the handle down, wait for the operator to respond, and clearly explain the emergency. (Operators usually understand English.)

(b) Read the box number to the operator.

(c) Return to the emergency scene if close to the callbox or stay at the callbox until police arrive.

(d) Help the injured person, but do not move the person unless his or her life is in danger.

(2) To call from a civilian telephone, dial the prefix and desired number. Emergency numbers for fire and police are posted in telephone booths. Collect calls cannot be made from pay telephones. Some telephones have separate, no-cost switches colored red for fire and green for police. To call the police, for example, flip the green switch and state the emergency.

(3) Personnel may call military emergency telephone numbers to request help (for example, fire, ambulance, police). The caller must state the nature and location (for example, city, casern, roadway, building, room, site) of the emergency.

67. INDIVIDUAL HEALTH RESPONSIBILITIES

a. Commanders should train personnel to protect themselves before the operation begins.

b. Leaders will check and verify that soldiers can perform lifesaving techniques.

c. Prompt and correct application of medical emergency procedures (for example, performing cardiopulmonary resuscitation (CPR), controlling bleeding, counteracting shock, preventing hot- and cold-weather injuries) is essential. Soldiers must be confident and capable in common tasks to save their own lives and the lives of other soldiers.

d. Commanders will ensure that soldiers know how and where medical help can be reached. Self-treatment of injuries will be temporary, sufficient, and followed by a prompt visit to a field first-aid station, MTF, dispensary, or hospital.

e. The following are common health hazards encountered by soldiers in USAREUR theater bivouac areas:

(1) Water. Natural bodies of water (lakes, ponds, quarries, rivers, and streams) are off-limits because of health hazards and the possibility of drowning.

(2) Poisonous Snakes. Five to 15 percent of snakebite cases result in death if untreated. Most people are attacked while handling snakes.

(a) The common European viper is brown, approximately 2 feet long as an adult, and has a round snout and a dark zigzag line from head to tail. These snakes are born in September and are poisonous from birth. They are usually found in bushes. European vipers raise their head only about 5 inches from the ground. They are not aggressive, but will bite when frightened.

(b) Victims of snakebites should be immobilized and a medium tourniquet applied between the wound and the heart. The victim should be taken to an MTF.

(3) Poisonous Mushrooms. Soldiers will not eat wild mushrooms or toadstools. Some are poisonous.

(4) Poisonous Berries. Soldiers will not eat wild berries. Some are poisonous or infested with fox tapeworm eggs.

(5) Rabid Animals. Rabies exists throughout Europe. The sign *Wildtollwut* in Germany means rabies is prevalent in the posted area. Soldiers should avoid wild and domestic European animals (including cats and dogs). Foxes are the primary carriers of rabies in Europe. If bitten by an animal, soldiers should—

(a) Try to secure the animal.

(b) Wash the bitten area with soap and water.

(c) Go immediately to the nearest MTF.

(6) Wild Boars. Wild boars may be found at MTAs and in forests. They will charge when provoked or when protecting their young. Soldiers will leave these animals alone. Wild boars can use their tusks to cause serious wounds.

(7) Insects and Pests (Ants, Bees, Hornets, Yellow Jackets, Scorpions, Spiders, Ticks). The best way to protect against insects and other pests are to—

(a) Use insect repellent and mosquito nets if necessary.

(b) Check areas for insect nests.

(c) Check clothes (especially boots) for spiders or scorpions before putting them on.

(d) Not leave open food or beverages unattended.

(e) If stung or bitten, try to secure the insect or pest (especially spiders and scorpions) and go immediately to the nearest MTF.

(8) Rodents. The best protection against rodents is to—

(a) Check for rodents and report any observations.

(b) Avoid handling rodents (alive or dead) to prevent transmitting diseases.

(c) Avoid having food in living areas because it will attract rodents.

(d) Store food and trash in impenetrable containers.

(e) If bitten, try to secure the animal and go immediately to the nearest MTF.

SECTION XVIII PREVENTING COLD- AND HOT-WEATHER INJURIES

68. COLD-WEATHER INJURIES

a. Responsibilities. Preventing cold-weather injuries is a command responsibility.

(1) Unit commanders will appoint a cold-weather-injury prevention officer or NCO who is familiar with TB MED 81, UP 350-7, and this pamphlet. This officer or NCO will obtain information and identify soldiers with previous cold-weather injuries to ensure that they receive appropriate taskings and supervision.

(2) Troop leaders will ensure personnel are protected from cold-weather injuries. Soldiers will be supervised during periods of exposure.

(3) Soldiers will keep cold-weather gear serviceable and will wear the gear when directed.

(4) Tables 5 and 6 are a Wind Chill Index and a Wind Chill Category table, respectively.

Table 5 Wind Chill Index																		
Wind mph	Temperature (F)																	
	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Calm	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
5	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
10	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
15	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
20	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
25	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
30	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
35	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
40	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
45	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
50	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
55	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98
Frostbite in:									30 min	10 min	5 min							

Little Danger ———→ | Increasing | ———→ Higher Danger
Danger

b. Reactions to Cold Weather.

(1) Trench foot or immersion foot occurs when wet feet are exposed to temperatures below 50 °F (10 °Celsius (C)).

(2) Frostbite occurs at freezing temperatures (32 °F or 0 °C and below). The body parts most vulnerable to frostbite are cheeks, ears, feet, fingers, forehead, nose, and wrists.

(3) Snow blindness—

- (a) Occurs when there is glare from ice or snow.
- (b) Usually does not occur on hazy or cloudy days.

Table 6 Wind Chill Categories			
Work Intensity	Little Danger	Increasing Danger	Higher Danger
High Digging foxhole, running, marching with rucksack, making or breaking bivouac	Increased surveillance by small-unit leaders; black gloves optional - mandatory below 0 °F; increased hydration	ECWCS or equivalent; mittens with liners; no facial camouflage; exposed skin covered and kept dry; rest in warm, sheltered areas; vapor-barrier boots below 0 °F	Postpone nonessential activity; essential tasks only with less than 15 minute exposure; workgroups of no less than 2; cover all exposed skin
Low Walking, marching without rucksack, drill and ceremony	Increased surveillance; cover exposed flesh when possible; mittens with liner and no facial camouflage below 10 °F; full head cover below 0 °F; keep skin dry, especially around nose and mouth	Restrict nonessential activity; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks (see above)	Cancel outdoor activity if possible
Sedentary Sentry duty, eating, resting, sleeping, clerical work	See above; full head-cover and no facial camouflage below 10 °F; cold-weather boots (VB) below 0 °F; shorten duty cycles; provide warming facilities	Postpone nonessential activity; 15-20 minute workcycles for essential tasks; workgroups of no less than 2 personnel; no exposed skin	Cancel outdoor activity if possible
General Guidance for Cold Weather Operations			
<p>Skin: Exposed skin is more likely to develop frostbite. Covering the skin lessens the risk provided the skin is kept dry.</p> <p>Clothing: Soldiers will change into dry clothing at least daily and whenever clothing becomes wet, and will wash and dry feet and put on dry socks at least twice daily.</p> <p>Nutrition: 4,500 calories per day per soldier. Equivalent to one ration-cold weather or four MREs.</p> <p>Hydration: 3 to 6 liters (canteens) per day per soldier. Warm, sweet, noncaffeinated drinks are preferable.</p> <p>Camouflage: Prevents detection of cold injuries. Not recommended below 10 °F.</p> <p>Responsibilities: Soldiers are responsible for preventing individual cold injuries. Unit NCOs are responsible for health and safety of their troops.</p>			

(4) Liquids are difficult to find and inconvenient to drink during cold-weather operations. This can cause soldiers to reduce liquid intake, which often leads to dehydration.

(5) Low temperatures slow thinking and reactions; this can cause accidents.

(6) Everyone is susceptible to cold-weather injuries. The following factors increase the chance of contracting a cold-weather injury:

(a) A previous cold-weather injury.

(b) Fatigue. (Persons may become tired and fail to take simple preventive measures.)

(c) Skin type. A dark-skinned soldier is about six times more vulnerable to cold-weather injuries than a light-skinned soldier, and the injury is usually more severe.

(d) Tobacco and alcohol use.

(e) Too little or too much physical activity. Overactivity with labored breathing may cause the loss of large amounts of body heat. Too little activity decreases body-heat production. Perspiring reduces the insulating quality of clothing.

c. Training Requirements.

(1) A medical officer or cold-weather-injury prevention officer or NCO will use UP 350-7 to brief and train soldiers and unit leaders on preventing, recognizing, and treating cold-weather injuries.

(2) Cold-weather-injury prevention officers and NCOs will address the type and use of cold-weather gear to be issued and carried by personnel. They also will explain the following cold-weather dress code. Soldiers will wear—

(a) One pair of socks and glove inserts at a time. Wearing more than one pair can make boots and gloves too tight and restrict blood circulation.

(b) Several layers of loose clothing to protect the upper body. Clothing may be removed in layers as needed.

(c) A hat, scarf, or other clothing to protect the ears and nose when temperatures are extremely low.

(d) Insulated boots in snow and slush; during cold, damp weather; or when the ground is frozen. Wearing these boots is especially important when soldiers have limited movement or ride in open vehicles.

d. Other Preventive Measures. Commanders will ensure soldiers—

(1) Keep their bodies, especially their feet, clean and dry. Soldiers will change socks and massage their feet at least every 12 hours.

(2) Avoid extreme activity and inactivity.

(3) Exercise their feet and hands, and massage their face for better blood circulation.

(4) Eat hot food and drink warm liquids when possible.

(5) Sit or stand on something that insulates (for example, cardboard, weeds) instead of cold or wet ground.

(6) Avoid handling cold materials with bare hands and letting bare skin touch cold metal, snow, and other objects that retain the cold.

(7) Tighten and relax arm and leg muscles.

(8) Bend their knees.

(9) Stamp their feet.

(10) Run in place.

(11) Wiggle their toes and fingers.

(12) Elevate their feet, when possible, to help blood circulation.

(13) Remove their boots before getting into a sleeping bag.

(14) Use the buddy system to check each other for signs of cold-weather injury.

e. Wearing MOPP Gear in the Cold. Unit leaders will ensure soldiers take precautions to prevent cold-weather injuries while wearing MOPP gear.

(1) Perspiration collects inside the facepiece and may freeze when MOPP gear is removed outside. Soldiers should—

(a) Exchange MOPP gear or unmask in warm areas, when possible.

(b) Wipe the face and the inside of the mask with a cloth (an extra glove, sock, handkerchief, woolen scarf) to keep perspiration from freezing after unmasking.

(2) Exposed metal rivets inside the facepiece may contribute to discomfort and frostbite to the part of the face the rivets touch. Soldiers should—

(a) Place a small piece of tape over exposed metal rivets inside the facepiece. The tape should be only large enough to cover the metal and not so large that it interferes with putting on or wearing the mask.

(b) Not tape over metal buckles on the protective mask. The metal buckles should have little or no contact with the skin if the mask is worn properly. Taping the buckles could interfere with the proper adjustment, fit, clearing and sealing of the mask.

(3) Hands are susceptible to cold-weather injury when soldiers wear chemical protective gloves. Soldiers should wear—

(a) The green woolen liners from the black-leather-shell gloves underneath the protective gloves instead of the white glove liners.

(b) Standard work gloves, standard-issue cold weather mittens, or black-leather-shell gloves over the butyl-rubber gloves.

(4) Ears are susceptible to cold-weather injury when soldiers wear the protective mask and hood. Soldiers (outside the Arctic Circle) who are not issued a balaclava (combination ski mask and cap) should wear one of the following:

(a) Hooded cold-weather parka over the MOPP jacket. Soldiers should mask with the hood and the helmet.

(b) Sleeping cap issued with the cold-weather sleeping bag.

f. Symptoms of Cold-Weather Injury. Persons suffering a cold-weather injury may experience—

(1) A tingling sensation, aches, or cramps.

(2) White and wrinkled soles of the feet. Walking and standing are extremely painful.

(3) Waxy and pale or red skin. This is a symptom of more severe cold-weather injuries.

(4) A scratchy feeling when eyelids close. This can be an early symptom of snow blindness.

g. Basic First Aid. Personnel will seek medical treatment as soon as possible and will follow the appropriate instructions in (1) through (4) below.

(1) Frostbitten Face. Cover the affected area with bare hands until color returns to the casualty's face.

(2) Frostbitten Feet. Remove the casualty's boots and place the exposed feet under clothing and against the body of another person.

(3) Frostbitten Hands. Open the casualty's field jacket and shirt and place his or her hands under the armpits. Close the shirt and field jacket to prevent further exposure.

(4) Snow Blindness. Cover the person's eyes with a dark cloth, shutting out all light.

(5) Superficial Frostbite. Rub the affected area with bare hands.

h. Hospitalization. Cold-weather injuries requiring hospitalization will be reported using the Special Telegraphic Report of Selected Condition (RCS: MED-16(R4)) (AR 40-400, paras 6-1, 6-2, 6-3, and 6-7). Lost-time injuries will be reported on DA Form 285-AB-R.

69. HOT-WEATHER INJURIES

a. Responsibilities. Responsibilities for preventing heat injuries are the same as those for preventing cold-weather injuries (para 68). Heat-injury-prevention officers and NCOs will be familiar with TB MED 507 and this pamphlet.

b. Types of Heat Injuries. The following are common heat injuries:

(1) Heat Cramps. Heat cramps are painful muscle contractions of the limbs, stomach, and back. They are caused by heavy salt losses through sweating.

(2) Heat Exhaustion. Heat exhaustion is an inability to continue working in the heat. It is usually characterized by extreme fatigue, nausea, vomiting, giddiness, muscle cramps, rapid breathing, and fainting.

(3) Heat Stroke. Heat stroke is a breakdown of body-temperature control accompanied by severe mental impairment. It is characterized by a throbbing headache, bizarre behavior, coma, disorientation, elevated body temperature, flushed, dry skin, lack of perspiration, mental confusion, or nausea.

(4) Sunburn. Sunburn is caused by overexposing skin to the ultraviolet radiation of the sun. Severe sunburn is disabling and may cause a victim to more easily get other forms of heat injury.

c. Heat Casualties During MOPP Training. Dehydration may cause heat casualties during MOPP training. Leaders will institute and enforce a drinking policy; soldiers must drink enough water to replace body fluids lost in perspiration (FM 3-4). Dehydration can occur under moderate temperatures during extended operations in MOPP level 4. Most personnel are not aware they are becoming dehydrated. TB MED 507 explains the need to acclimatize and gradually increase the workload in stress situations. Soldiers will not wear full MOPP gear for 6 hours a day until they are acclimatized and trained properly.

d. Preventive Measures.

(1) Heat-injury-prevention officers and NCOs or medical officers will brief and train leaders and soldiers in preventing, recognizing, and treating heat injuries. These briefings should include at least the items in (a) through (g) below. Tables 7 and 8 provide information that can be used in training and in planning activities during warm weather.

(a) Recognizing and avoiding causes of heat injury.

(b) First aid.

(c) Adjusting to the weather. People may adjust to heat by working in hot environments for limited times. Significant adjustments may be made in 1 to 2 weeks of limited exposure; long periods of adjustment, however, are not always possible in field exercises or short operations.

(d) Consuming proper amounts of salt and water. Adequate water intake is the most important factor in avoiding heat injury. Water loss from sweat can be as much as 1 quart (canteen) an hour. The body also loses large amounts of salt with water loss. Regular meals normally provide enough salt replacement.

Table 7 Heat Injury Index							
Heat Category	WBGT °F	Easy Work		Moderate Work		Hard Work	
		Work/Rest*	Water Per Hour	Work/Rest*	Water Per Hour	Work/Rest*	Water Per Hour
1	78-81.9	No Limit	0.5 qt	No Limit	0.75 qt	40/20 min	0.75 qt
2	82-84.9	No Limit	0.5 qt	50/10 min	0.75 qt	30/30 min	1.0 qt
3	85-87.9	No Limit	0.75 qt	40/20 min	0.75 qt	30/30 min	1.0 qt
4	88-89.9	No Limit	0.75 qt	30/30 min	0.75 qt	20/40 min	1.0 qt
5	>90	50/10 min	1.0 qt	20/40 min	1.0 qt	10/50 min	1.0 qt

• Rest means minimal physical activity (sitting or standing) and should be accomplished in the shade if possible.

NOTES: 1. The work/rest times and fluid replacement volumes must sustain performance and hydration for at least 4 hours of work in the specified heat category. Individual water needs will vary ± 0.25 quart (qt) per hour.
 2. CAUTION: Hourly fluid intake should not exceed 1.5 quarts. Daily fluid intake should not exceed 12 quarts.
 3. MOPP gear or body armor adds 10 °F to WBGT Index.

Table 8 Work Levels		
Easy Work	Moderate Work	Hard Work
<ul style="list-style-type: none"> • Weapon maintenance • Walking on hard surface at 2.5 mph, 30-pound load • Manual of arms Drill and ceremony 	<ul style="list-style-type: none"> • Walking on loose sand at 2.5 mph, no load • Walking on hard surface at 3.5 mph; <40-pound load • Calisthenics • Patrolling • Individual movement technique (for example, low crawl, high crawl) • Defensive-position construction • Field assaults 	<ul style="list-style-type: none"> • Walking on hard surface at 3.5 mph, 40-pound load • Walking on loose sand at 2.5 mph with load

NOTE: Soldiers who are overweight, dieting, or past heat casualties are more prone to heat injuries. As a result, their activities must be closely monitored.

(e) Wearing clothing and equipment properly to prevent heat injury. Loose-fitting clothing allows air to circulate around the body and enhances the cooling effect when sweat evaporates. Clothing should be removed in shaded areas. Soldiers should not blouse trousers or wear tight neckwear in hot environments.

(f) Following the wet bulb globe temperature (WBGT) index. The WBGT kit is an instrument (NSN 6665-00-159-2218) for providing information on hot-weather risks to troops undergoing training or operations. The information is displayed on a scale in the form of an index, computed from weighted readings obtained from three different thermometers. These kits are maintained and used by supporting medical facilities or the unit's battalion aid station; therefore they should be contacted for the WBGT reading when hot weather is prevalent.

(g) Using a sunscreen to prevent sunburn.

(2) Soldiers should avoid direct exposure to the sun as much as possible.

(3) The heavy meal of the day should be eaten in the evening rather than at noon on hot days.

e. Basic First Aid. Personnel will follow the instructions in (1) through (4) below to treat the common heat injury listed.

(1) Heat Cramps. Move the patient to a cool, shaded area, loosen clothing, and give water. If symptoms persist, seek medical assistance.

(2) Heat Exhaustion. (IF IN DOUBT, TREAT AS HEAT STROKE).

(a) Move the patient to a cool, shaded area.

(b) Open clothing. Cool the patient's body with water and fanning.

(c) Give up to 1 quart of cool water, sipped slowly.

(d) Remove boots and elevate legs.

(3) Heat Stroke. The patient must be taken to the nearest MTF. Time is important. While waiting for evacuation—

(a) Keep the patient in as cool and as shaded an area as possible.

(b) Open or remove clothing. Cool the patient's body by immersing it in or soaking it with water and fanning.

(c) If the patient is conscious, slowly give up to 1 quart of cool water.

(d) Remove boots, elevate legs, and massage arms and legs.

(4) Sunburn. Sunburn is a result of repeated exposure to hot environments (even on cloudy days) and depletion of body fluids. When exposed to sunburn environments, do the following:

(a) Use sunscreen with SPF 15 or greater.

(b) Cover the body part that is being burned.

(c) Seek medical treatment if there is pain or blistering.

f. Hospitalization. Heat injuries requiring hospitalization will be reported using the Special Telegraphic Report (RCS: MED-16 (R4)) (AR 40-400, chap 2, sec III). Lost-time injuries will be reported on DA Form 285.

SECTION XIX PREVENTING CARBON-MONOXIDE POISONING

70. BACKGROUND

a. Carbon monoxide is formed when fuel is burned in the absence of enough oxygen or when combustion is incomplete. The fuels that produce the greatest risk of carbon-monoxide poisoning are coal, coke, natural and manufactured gas, petroleum products, and wood. Operating an internal combustion engine or stove may produce carbon monoxide. Petroleum-powered space heaters and internal-combustion engines present the greatest hazard of carbon-monoxide poisoning.

b. Carbon-monoxide poisoning can be caused by—

(1) Bathing or showering in a room that has an improperly vented space heater or gas-powered water heater.

(2) Operating engines in inadequately ventilated areas.

(3) Placing field-generator exhausts near troop areas.

(4) Sleeping in a room warmed by a space heater that has a leaky vent or no outside stack or vent.

(5) Sleeping in a vehicle with the engine running.

(6) Using the exhaust of a motor vehicle to warm people or equipment.

71. RESPONSIBILITIES

a. Commanders and supervisors will ensure subordinates are briefed on—

(1) The dangers of operating fuel-operated equipment.

(2) First-aid treatment for carbon-monoxide poisoning.

b. Supervisors will frequently inspect workplaces and sleeping areas.

c. Senior occupants of sleeping quarters will control heater settings.

72. PRECAUTIONS

To prevent carbon-monoxide poisoning, soldiers will—

a. Check heating and cooking appliances before leaving the premises where these appliances have been used.

b. Check hoses, pipes, fittings, and connections on appliances daily.

c. Ensure—

(1) Heating and cooking devices are ventilated adequately.

(2) The proper fuel is being used in burners and appliances.

(3) There is a safety shutoff valve on gas appliances.

d. Maintain proper room ventilation at all times, especially in sleeping quarters.

e. Shut off appliances when they are not being used.

f. Vent vehicle exhaust outside or turn off motors in unventilated buildings, tents, and other enclosures. Operators and mechanics will inspect vehicles thoroughly for exhaust leaks during service maintenance.

73. SYMPTOMS OF CARBON-MONOXIDE POISONING

a. The symptoms of carbon-monoxide poisoning vary, depending on the concentration of the gas and the duration of the exposure. A person may lose consciousness without warning.

b. The effects of carbon-monoxide poisoning are not so unpleasant that a sleeping person would awaken. Comparatively low concentrations of carbon monoxide can be dangerous because the accumulation of the poison is a gradual process and may not be noticed immediately.

c. Carbon-monoxide poisoning symptoms may include a mild headache, nausea, and fatigue. More severe symptoms may progress through the following stages, depending on the degree of poisoning:

- (1) Severe, throbbing headache.
- (2) Generalized weakness and dizziness.
- (3) Dimness of vision.
- (4) Nausea and vomiting.
- (5) Lack of coordination.
- (6) Collapse.
- (7) Convulsions.
- (8) Death.

74. TREATING CARBON-MONOXIDE POISONING

To treat victims of carbon-monoxide poisoning—

- a. Move the person to fresh air.
- b. Call for medical aid immediately.
- c. Keep the person warm and quiet.
- d. Watch the person for weak or irregular breathing.
- e. Initiate CPR if necessary.

**SECTION XX
LASER SAFETY**

75. INTRODUCTION

a. The effects of lasers are basically the same as optical radiation produced by ultraviolet, infrared, and visible-light sources. Laser radiation is unique, however, because a large number of the light beams are parallel and very intense and because many laser devices produce only one color. The increased directional intensity of optical radiation results in a concentrated optical beam of light that can travel considerable distances.

b. Military lasers are used principally for target detection and fire control. The widespread use of lasers increases the possibility of exposure to injurious levels of laser radiation. Laser range-finders and designators are potentially hazardous, but the risk can be minimized with adequate safeguards.

76. GENERAL

Increased use of military lasers for range-finding and target designation as well as the availability of inexpensive laser pointers significantly increases the potential for laser exposure. Aircraft are especially vulnerable to being hit by laser beams. The aircraft AN/AVR-2 laser detector provides the pilot an indication of laser exposure but cannot distinguish lasers by their illumination characteristics. This makes assessment of potential injury impossible. Lasers can pose a threat to ground forces during maneuver training, firing exercises, and real-world missions. Maintenance personnel are exposed during maintenance on lasers. Lasers can be hazardous at great distances. For military laser beams, this distance can be from 10 kilometers for the unaided eye up to 100 kilometers for viewing through unprotected optics.

a. Proper awareness of laser hazards is the primary prevention tool. Information is available at <http://chppm-www.apgea.army.mil>.

b. Range safety requirements in AR 385-63 will be used to protect personnel during training and maneuver exercises. Do not track friendly targets with lasers.

c. Sunglasses and standard clear and tinted helmet visors provide virtually no protection against military lasers. They do provide some protection against dazzle and flash blindness from laser pointers.

d. Laser-protective eyewear (for example, Gargoyles or B-LPS) with laser filters provides protection against the lasers that represent the greatest threat.

e. Two-notch (NSN 8415-01-394-8026) and three-notch (NSN 8415-01-394-8024) laser visors for the HGU-56p flight helmet and two-notch visor for Apache pilots (NSN 1270-01-327-3107) provide protection against the lasers considered to present the greatest threat. "Notches" refers to the section of the spectrum for which protection is provided. All devices degrade visual performance and may affect the wearer's ability to view cockpit displays and warning lights. Two-notch visors may be worn during the day or at night, but three-notch visors are too dark to be worn safely at night.

f. NVGs provide protection since the laser energy does not pass through the goggle, but users will see a "bloom."

g. Direct-viewing optical systems do not provide protection unless they have a laser filter installed. Instrument magnification increases eye hazards to users.

h. Individuals who believe they have been shot with a laser should not rub their eyes. This can cause injury or worsen the laser injury. Most incidents produce only temporary symptoms with no permanent loss of sight. Individuals with suspected or confirmed exposure to lasers must have an eye examination within 24 hours after exposure.

i. Commanders will appoint a laser range safety officer in writing. This individual will be knowledgeable in the use, principles, hazards, and protective equipment (for example, eyewear) associated with laser equipment. Commanders will establish a written SOP or an approved laser safety guide to ensure compliance with TB MED 524 and with AR 385-63 and USAREUR Supplement 1.

(1) Medical surveillance programs will be established for all laser workers and incidental laser workers according to DA policy.

(2) Except for its inability to penetrate targets, commanders will consider precautions for laser systems identical to a direct-fire, line-of-sight weapon, such as a rifle or a machinegun. Accordingly, lasers will be fired only at approved targets. When the laser filters are removed, lasers will be fired only on approved laser ranges.

(3) Personnel who have a high risk of laser exposure will be placed in a medical surveillance program according to TB MED 524.

j. The following are special control measures for laser use:

(1) The hazard of laser devices is exposing unprotected eyes to a direct laser beam or to a laser beam reflected from a mirror-like surface. Serious eye damage with permanent vision impairment can result from exposure to laser beams at ranges less than the nominal hazardous distance (NOHD).

(2) Commanders will ensure targets have a backstop (for example, a hill) during laser training. Because a laser beam travels in a straight line, the calculated NOHD often is long.

(3) Every object a laser beam strikes will reflect some energy back to the laser. This energy is a diffuse reflection and usually is not hazardous. To prevent reflecting hazardous amounts of radiation, operators will not use shiny, reflective surfaces as targets.

k. Using optical devices to observe targets during laser operations should not be permitted unless both of the following actions have been taken:

(1) Flat, reflective surfaces have been removed from the target area.

(2) Appropriate laser safety filters have been placed in the optical train of the binocular, laser, or telescope.

l. Soldiers will wear B-LPSs (if issued) while participating in tactical field training exercises.

77. LASER SYSTEM DESCRIPTIONS

AR 385-63 and USAREUR Supplement 1 list laser systems and their surface danger zones.

SECTION XXI

RF AND MICROWAVE RADIATION PROTECTION

78. BACKGROUND

a. Developments in radar, communication systems, and missile technology have resulted in the use of high-power output microwave transmitters.

b. Most microwave equipment produces intense nonionizing radiation that may injure people who are exposed to it.

c. Standards and safeguards for microwave radiation have been incorporated into system development, equipment manufacture, operating techniques, and maintenance procedures.

d. Commanders, equipment installers, operators, maintenance personnel, and other persons monitoring equipment are responsible for protecting people from microwave radiation sources under their control.

79. HAZARDS

a. General Hazards.

(1) The microwave region of the electromagnetic spectrum (10 to 300,000 megahertz) has a different frequency than X rays and gamma rays.

(2) Microwaves—

(a) Are between the very high frequency radio and infrared portions of the electromagnetic spectrum.

(b) Can heat and penetrate the human body.

(3) Microwave radiation produces electric and magnetic forces and generates heat. These effects can be useful (such as in microwave ovens), but are potentially dangerous.

b. Hazards to the Body.

(1) Heating of body tissue is the main hazard associated with absorbing microwave and RF radiation, because the body is comprised mainly of water. A lot of heat is required to raise the body temperature 1 °C.

(2) The eyes and testicles are more susceptible to heat than the rest of the body.

(a) The blood circulation to the lens of the eye cannot distribute heat. Destroyed eye cells collect at the rear of the eye capsule and may cloud vision. Cataracts may develop when the eye is exposed to power densities of 100 milliwatts or more per square centimeter. A safety factor of 10 is applied to set the base exposure standard to 10 milliwatts.

(b) The testicles are sensitive to temperature. Sperm production will cease when the temperature rises a few degrees. This change is reversible when the body returns to a normal temperature.

(3) A person may hear a buzz when exposed to microwave radiation. This sound is probably the pulse-repetition frequency, not the microwave frequency.

80. CONTROL MEASURES

a. General Control.

(1) Engineering controls are the best way to prevent microwave and RF radiation hazards. These controls may range from restricting azimuth and elevation settings on radar antennas to completely shielding and enclosing the sources of electromagnetic radiation in communications and navigation equipment.

(2) Maintaining strict standards for communications equipment may prevent microwave and RF radiation hazards to personnel operating or servicing such equipment. Varying strict standards when installing, moving, or modifying equipment can be hazardous to site personnel.

(3) The Surgeon General, HQDA, is responsible for microwave and RF protection programs (AR 40-5). The Command Surgeon, USAREUR, is responsible for microwave and RF (nonionizing) protection programs in USEUCOM.

(4) Requests for microwave and RF hazard surveys in USAREUR must be sent through command channels to the Center for Health Promotion and Preventive Medicine-Europe.

b. Command Control.

(1) Commanders, site chiefs, and supervisors will—

(a) Establish measures to prevent exposing people to microwave and RF radiation. Measures must include excluding personnel from the beam path at points where the power density level exceeds the safety standard.

(b) Develop checklists and inspect equipment at least once a week. Records must be maintained at each site.

(c) Ensure microwave- and RF-radiating equipment components are inspected daily for—

1. Breaks.
2. Cracks.
3. Fatigue.
4. Flange-assembly damage.
5. Flange-thread stripping.
6. Gasket condition.
7. Overstressing.

(d) Conduct initial and periodic briefings on radiation safety for personnel working around microwave- or RF-radiating equipment. Potential health hazards associated with exposure to rays from specific equipment must be stressed.

(2) Supervisors will consider the following when determining the number of people required to operate and maintain electronic equipment safely:

(a) Degree of isolation and availability of help in case of an emergency.

(b) Physical conditions where the work is to be performed (for example, a congested workarea, a wet work surface, elevation of work, lighting, noise, weather conditions for outside work).

(c) Physical condition of the persons and procedures to be used.

(d) Type and layout of equipment.

(e) Type of function to be performed.

(3) Supervisors, operators, and maintenance personnel will prescribe conditions under which interlocks (limiting or warning devices installed on equipment) may be bypassed or overridden during combat alerts, training exercises, and equipment maintenance and calibration.

(4) Site supervisors will publish and enforce, as required, general and specific SOPs. SOPs must include guidance on—

(a) Controlling, positioning, and operating microwave- and RF-radiating equipment.

(b) Elevating antennas.

(c) Interlocking functions.

**APPENDIX A
REFERENCES**

A-1. ARMY REGULATIONS

AR 11-9, The Army Radiation Safety Program

AR 11-34, The Army Respiratory Protection Program

AR 40-5, Preventive Medicine

AR 40-21, Medical Aspects of Army Aircraft Accident Investigation

AR 40-400, Patient Administration

AR 95-1, Fight Regulations

AR 200-1, Environmental Protection and Enhancement

AR 385-40, Accident Reporting and Records

AR 385-42, Investigation of NATO Nation Aircraft or Missile Accidents
and Incidents

AR 385-55, Prevention of Motor Vehicle Accidents

AR 385-63 and USAREUR Supplement 1, Policies and Procedures for
Firing Ammunition for Training, Target Practice, and Combat

AR 385-64, U.S. Army Explosives Safety Program

AR 600-55, The Army Driver and Operator Standardization Program
(Selection, Training, Testing, and Licensing)

AR 750-1 and USAREUR Supplement 1, Army Materiel Maintenance
Policy and Retail Maintenance Operations

A-2. DA PAMPHLETS

DA Pamphlet 40-501, Hearing Conservation Program

DA Pamphlet 385-1, Small Unit Safety Officer/NCO Guide

DA Pamphlet 385-40, Army Accident Investigation and Reporting

DA Pamphlet 385-64, Ammunition and Explosives Safety Standards

A-3. FIELD MANUALS

FM 1-300, Flight Operations Procedures

FM 3-4, NBC Protection

FM 10-23, Basic Doctrine for Army Field Feeding and Class I Operations Management

FM 10-67-1, Concepts and Equipment of Petroleum Operations

FM 21-60, Visual Signals

FM 21-305, Manual for the Wheeled Vehicle Driver

FM 55-30, Army Motor Transport Units and Operations

FM 100-14, Risk Management

A-4. TECHNICAL MANUALS

TM 9-1005-201-10, Operator's Manual for Machine Gun, 5.56-mm, M249 w/Equip (NSN 1005-01-127-7510) (EIC: 4BG) (TM 08671A-10/1A)

TM 9-1005-224-10, Operator's Manual for Machine Gun, 7.62-mm, M60 w/e (NSN 1005-00-605-7710) (EIC: 4AJ) and Machine Gun, 7.62-mm, M60D w/e (1005-00-909-3002) (EIC: 4A8) (TO 11W2-6-4-11)

TM 9-1005-313-10, Operator's Manual for Machine Gun, 7.62mm, M240 (NSN 1005-01-025-8095) and M240B (1005-01-412-3129) M240C (1005-01-085-4758) M240E1 (1005-01-252-4288) M240G (1005-01-359-2714) (TM 08670A-10/1A)

TM 9-1005-317-10, Operator's Manual for Pistol, Semiautomatic, 9mm, M9 (NSN 1005-01-118-2640)

TM 9-1005-319-10, Operator's Manual for Rifle, 5.56mm, M16A2 w/e (NSN 1005-01-128-9936) (EIC: 4GM); Rifle, 5.56mm, M16A3 (1005-01-357-5112); Rifle, 5.56mm, M16A4 (1005-01-383-2872) (EIC: 4F9); Carbine, 5.56mm, M4 w/e (1005-01-231-0973) (EIC: 4FJ); Carbine, 5.56mm, M4A1 (1005-01-382-0953) (EIC: 4GC) (TO 11W3-5-5-41); SW 370-BU-OPI-010

TM 9-4540-202-12&P, Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List) for Heater, Immersion, Liquid Fuel Fired; 35,000 BTU Output for Corrugated Cans (Military Model M67) (NSN 4540-00-469-6593)

TM 10-4500-200-13, Operator's, Organizational and Direct Support Maintenance Manual (Including Repair Parts and Special Tools List) For Heaters, Space: Radiant Type, Portable (Type I, Model 1941, Solid Fuel) (NSN 4520-00-257-4877); (Type II, Model 1941, Liquid Fuel) (4520-00-927-4214); (Yukon Model M1950, Solid or Liquid Fuel) (4520-00-287-3353); Heaters, Immersion: Liquid Fuel Fired for Corrugated Cans (All Makes and Models) (4540-00-266-6835) (Preway Model 447-2EX) (4540-00-266-6834)

TM 10-7360-204-13&P, Operator's, Organizational and Direct Support Maintenance Manual Including Repair Parts and Special Tools List for Range Outfit, Field: Gasoline, Model M59 (NSN 7360-00-082-2153), Burner Unit, Gasoline, Model M2 (7310-00-842-9247); Model M2A (7310-01-017-1285); Model M2A w/Safety Device (7310-01-113-9172) and Accessory Outfit, Gasoline, Field Range w/Baking Rack (7360-00-187-4757)

TM 38-250, Preparing Hazardous Materials for Military Air Shipments

A-5. TECHNICAL BULLETINS

Technical Bulletin (TB) 9-1300-278, Guidelines for Safe Response to Handling, Storage, and Transportation Accidents Involving Army Tank Munitions or Armor Which Contain Depleted Uranium

TB 43-0142, Safety Inspection and Testing of Lifting Devices

TB MED 81, Cold Injury

TB MED 507, Prevention, Treatment and Control of Heat Injury

TB MED 524, Control of Hazards to Health From Laser Radiation

A-6. TRAINING CIRCULARS

Training Circular (TC) 21-305, Training Program for Wheeled Vehicle Accident Avoidance

TC 21-305-2, Training Program for Night Vision Goggle Driving Operations

A-7. AE AND USAREUR REGULATIONS

AE Regulation 10-5, HQ USAREUR/7A Organizations and Responsibilities

AE Regulation 55-4, Safe Movement of Hazardous Goods by Surface Modes

AE Regulation 385-7, Respiratory Protection Program

AE Regulation 600-55, Driver- and Operator-Standardization Program

UR 55-1, United States Army Motor Vehicle Operations on Public Roads

UR 95-1, USAREUR Aviation--General Provisions and Flight Regulations

UR 190-1, Registering and Operating Privately Owned Motor Vehicles in Germany

UR 200-1, USAREUR Environmental Quality Program

UR 385-4, Tactical Overwater Operations

UR 385-40, Accident Reporting and Records

UR 385-55, Prevention of Motor Vehicle Accidents

UR 385-64, USAREUR Explosives Safety Program

A-8. AE AND USAREUR PAMPHLETS

AE Pamphlet 385-15-2, Commander's Rail Operations Checklist and Risk Assessment

UP 190-34, Drivers Handbook and Examination Manual for Germany

UP 350-7, Winning in the Cold

UP 385-15-1, Commander's Convoy Checklist and Risk Assessment

UP 385-15-3, Port Operations Checklist and Risk Assessment

UP 385-15-4, Sea and Supercargo Operations Checklist and Risk Assessment

A-9. MISCELLANEOUS PUBLICATIONS

Standardization Agreement (STANAG) 3101, Exchange of Accident/Incident Information Concerning Aircraft and Missiles

Code of Federal Regulation, title 29, part 1910, Occupational Safety and Health Act Standard (29 CFR 1910) (This publication is available through local safety offices or on-line at <http://www.gpoaccess.gov/cfr/index.html>).

Leader's Guide to Crew Endurance (This publication is available at <http://safety.army.mil/pages/pov/arac/crewend.pdf> or from the United States Army Safety Center.)

A-10. FORMS

DD Form 626, Motor Vehicle Inspection

DD Form 1348, DOD Single Line Item Requisition System Document (Manual)

DD Form 1348-1A, Issue Release/Receipt Document

DA Form 285, U.S. Army Accident Report

DA Form 285-AB-R, U.S. Army Abbreviated Ground Accident Report (AGAR)

DA Form 581, Request for Issue and Turn-In of Ammunition

DA Form 2028, Recommended Change to Publications and Blank Forms

DA Form 5987-E, Motor Equipment Dispatch

DA Form 5988-E, Equipment Inspection Maintenance Worksheet

DA Form 7305-R, Telephonic Notification of Aviation Accident/Incident

DA Form 7306-R, Telephone Notification of Ground Accident

DA Form 7319-R, Explosive Waiver/Exemption Request

**APPENDIX B
HAZARD-PROBABILITY TABLES**

B-1. GENERAL

This appendix provides tables for assessing hazards and accepting risks. Table B-1 is a risk-assessment table. Paragraphs B-2 through B-4 explain the parts of this table. Table B-2 will be used to determine the probability of risks when using explosives. Table B-3 will be used to determine approval authorities for accepting risks involved in the use of hazard division 1.1 and 1.2 material.

Table B-1 Risk Assessment Table					
EFFECT	HAZARD PROBABILITY				
	FREQUENT A	LIKELY B	OCCASIONAL C	SELDOM D	UNLIKELY E
CATASTROPHIC I	EXTREMELY HIGH (20)	EXTREMELY HIGH (18)	HIGH (15)	HIGH (13)	MEDIUM (8)
CRITICAL II	EXTREMELY HIGH (19)	HIGH (16)	HIGH (14)	MEDIUM (9)	LOW (4)
MARGINAL III	HIGH (17)	MEDIUM (11)	MEDIUM (10)	LOW (5)	LOW (2)
NEGLIGIBLE IV	MEDIUM (12)	LOW (7)	LOW (6)	LOW (3)	LOW (1)

B-2. EFFECT

The meanings of items in the Effect column of table B-1 are as follows:

a. Catastrophic. Death or permanent, total disability; system loss; and major property damage.

b. Critical. Permanent, partial disability; temporary, total disability for more than 3 months; major system damage; and significant property damage.

c. Marginal. Minor injury, lost workdays, compensable injuries or illnesses, and minor system or property damage.

d. Negligible. A need for first aid or minor supportive medical treatment and minor system damage.

B-3. PROBABILITY

Unit experience and exposure affect the probability of an occurrence. The meanings of items in the Hazard Probability row of table B-1 are as follows:

a. Frequent.

(1) Individual Soldier or Equipment Item. Risk often occurs in the soldier's career or the equipment item's service life.

(2) All Soldiers or Equipment Items Exposed. Soldiers or equipment items continuously are exposed to the risk.

b. Likely.

(1) Individual Soldier or Equipment Item. Risk occurs several times during the soldier's career or in the equipment item's service life.

(2) All Soldiers or Equipment Items Exposed. Soldiers or equipment items frequently are exposed to the risk.

c. Occasional.

(1) Individual Soldier or Equipment Item. Risk occurs sometimes in the soldier's career or the equipment item's service life.

(2) All Soldiers or Equipment Items Exposed. Soldiers or equipment items are sporadically exposed to the risk.

d. Seldom.

(1) Individual Soldier or Equipment Item. The risk may occur in the soldier's career or the equipment item's service life.

(2) All Soldiers or Equipment Items Exposed. There is a remote chance the soldier or equipment item will be exposed to the risk.

e. Unlikely.

(1) Individual Soldier or Equipment Item. Risk probably will not occur in the soldier's career or the equipment item's service life.

(2) All Soldiers or Equipment Items Exposed. Risk exposure is possible, but improbable. Exposure occurs very rarely in the soldier's career or the equipment item's service life.

B-4. SEVERITY LEVELS

The meanings of the severity levels in table B-1 are as follows:

a. Extremely High. The risk results in the inability to accomplish the mission.

b. High. The risk significantly reduces mission capabilities.

c. Medium. The risk moderately reduces mission capabilities.

d. Low. The risk has little or no effect on the mission.

B-5. CONDUCTING EXPLOSIVE SAFETY RISK ASSESSMENTS AND DETERMINING DECISION AUTHORITIES

Leaders will use the following when conducting risk assessments on activities that involve the use of explosives (UR 385-64).

a. Severity. Determine the severity of a possible explosion by computing the blast and fragmentation effects using the formula $D = KQ^{1/3}$ where—

(1) D = distance in meters.

(2) K = severity factor used for each risk level assumed or permitted (defined in UR 385-64, fig B-1).

(3) Q = net explosive quantity (NEQ) in kilograms.

NOTE: DA Pamphlet 385-64, paragraph 5-4, and UR 385-64, appendix B, provide more information on using this formula.

b. Probability. To determine the probability of an explosion—

(1) Select the activity type from the left column of table B-2.

(2) Choose the activity environment from the top of table B-2.

Table B-2 Probability-Determination Chart							
Activity Type	Activity Environment						
	Operations in a hostile area	Unserviceable items awaiting destruction	Initial tests of new systems	Outdoors in inclement weather	Exercises/ contingencies/alerts	Flightlines	Missile systems
Assembly/disassembly/LAP/ maintenance/Renovation	L	NA	L	O	O	O	O
Demil/demolition/disposal	L	L	NA	O	O	NA	O
Training	L	NA	NA	S	S	S	S
Handling/loading	O	O	O	S	S	S	S
Transportation--break bulk	S	NA	NA	S	S	S	S
Transportation--containerized	U	NA	U	U	U	U	U
Inspection	U	NA	O	U	U	U	U
Storage	U	NA	U	U	U	U	U
Key: L=frequent/likely, O=occasional, S=seldom, U=unlikely, NA=not applicable							

B-6. RISK-LEVEL AND DECISION-AUTHORITY DETERMINATION

a. To determine the risk level—

(1) Match the effect information (table B-1 and para B-2) with the appropriate severity section on the top row of table B-3.

(2) Match the probability information (para B-5b) with the probability in table B-3.

b. The block where the probability and severity intersect will determine the risk and approval authority for the activity.

Table B-3 USAREUR Decision-Authority for Ammunition and Explosives					
Probability	Severity $D=KQ^{1/3}$ (D=distance, K=severity factor, Q=NEQ)				
	Catastrophic $D=2.4Q^{1/3}$	Catastrophic $D=4.4Q^{1/3}$	Critical $D=7.2Q^{1/3}$	Marginal $D=9.6Q^{1/3}$	Negligible $D=16Q^{1/3}$
Frequent/likely	Extremely high	Extremely high	Extremely high	High	Medium
Occasional	Extremely high	High	High	Medium	Low
Seldom	High	High	Medium	Low	Low
Unlikely	Medium	Medium	Low	Low	Low
<p>DECISION AUTHORITY:</p> <p>a. The CG, USAREUR/7A, is the approval authority for extremely high-risk waivers and all exemptions.</p> <p>b. A general officer must approve high- and medium-risk waivers.</p> <p>c. Commanders of USAREUR commands (AE Reg 10-5, app A) may approve low-risk waivers.</p>					
<p>NOTES: 1. Off-installation exposures must be coordinated with the host nation.</p> <p>2. For exposures of military family housing or nonmission-related structures of public assembly such as schools, churches, and hospitals, the approval authority may not be delegated below general-officer level.</p> <p>3. All waivers and exemptions will have a risk assessment.</p> <p>4. DA Form 7319-R will be completed for each waiver and exemption request.</p>					

APPENDIX C
ARMY VEHICLES AUTHORIZED TO TRANSPORT
AMMUNITION AND EXPLOSIVES

Table C-1 shows Army vehicles authorized to transport ammunition and explosives. Table C-2 shows maximum net explosive weight in kilograms that may be transported in a vehicle plus trailer. Abbreviations used in the tables are explained in the glossary.

Table C-1						
Vehicles Authorized to Carry Class 1 (notes 1 through 4)						
	1.1	1.2	1.3	1.4	1.5	1.6
M1008, TRUCK CARGO (EX/II)	X	X	X	X	X	X
M1074, PLS (EX/II)	X	X	X	X	X	X
M35 SERIES, 2½ TON TRUCK (EX/II)	X	X	X	X	X	X
M813 SERIES, TRUCK CARGO 5 TON (EX/II)	X	X	X	X	X	X
M814 SERIES, TRUCK CARGO 5 TON (XLWB) (EX/II)	X	X	X	X	X	X
M871 SERIES, TRAILER FLATBED (EX/II)	X	X	X	X	X	X
M872 SERIES, TRAILER FLATBED (EX/II)	X	X	X	X	X	X
M915 SERIES, TRUCK TRACTOR, LINE HAUL (EX/II)	X	X	X	X	X	X
M916, TRUCK TRACTOR (EX/II)	X	X	X	X	X	X
M923 SERIES, TRUCK CARGO 5 TON (EX/II)	X	X	X	X	X	X
M926 SERIES, TRUCK CARGO 5 TON (EX/II)	X	X	X	X	X	X
M928 SERIES, TRUCK CARGO 5 TON (EX/II)	X	X	X	X	X	X
M931 SERIES, TRUCK CARGO 5 TON (EX/II)	X	X	X	X	X	X
M932, TRUCK TRACTOR 5 TON (EX/II)	X	X	X	X	X	X
M977, HEMTT (EX/II)	X	X	X	X	X	X
M1009, CUCV (note 3)				X		
M101 SERIES, TRAILER CARGO ¾ TON (note 3)				X		
M1026, HMMWV (note 2)				X		
M105 SERIES, TRAILER CARGO 1½ TON (note 3)				X		
M998, HMMWV (note 2)				X		
Commercial and nontactical vans and trucks (note 4)	X	X	X	X	X	X
Commercial and nontactical vans and trucks (note 5)				X		

NOTES. 1. An X at the intersection indicates approval for transport.
 2. Servicing ASPs or QASASs should be contacted for vehicles not listed.
 3. These vehicles are limited to carrying hazard class and division 1.4, storage compatibility group S.
 4. U.S. Forces-owned diesel-engine type vehicles with a separate load compartment that have a valid HVCP or meet provisions of national law with an ADR vehicle certificate of approval as EX/II or EX/III.
 5. Vehicles without a diesel type engine, without a separate load compartment, without an HVCP, or without a commercial certificate as an EX/II or EX/III vehicle can be used only to transport hazard class and division 1.4S.

Table C-2 Maximum Net Explosive Weight for Transport Units (add vehicle plus trailer)								
Subdivision	1.1		1.2	1.3	1.4 (note)		1.5 and 1.6	Empty uncleaned packages
	A	Other than A	All	All	Other than S	S	All	
EX/II (kilograms)	6.25	1,000	3,000	5,000	15,000	Un- limited	5,000	Unlimited
EX/III (kilograms)	18.75	16,000	16,000	16,000	16,000	Un- limited	16,000	Unlimited
<p>NOTES: 1. The NEQ for 1.4S items being transported does not apply toward the total net explosive mass in the transport unit. 2. Military vehicles in table C-1 that are classified as EX/II can carry up to 7,500 kilograms net explosive weight for hazard class and division 1.1, 1.2, and 1.3 while operating in Germany.</p>								

**APPENDIX D
FIRE RESPONSE PROCEDURES INVOLVING DEPLETED
URANIUM (STABALLOY) AMMUNITION**

**SECTION I
RESPONSE PROCEDURES**

D-1. PURPOSE

This appendix establishes minimum procedures for preventing, fighting, reporting, and following up on accidents involving fires in vehicles loaded with ammunition containing depleted uranium.

D-2. GENERAL

Units using depleted uranium rounds will have at least one officer familiar with the procedures in this appendix and Technical Bulletin (TB) 9-1300-278. This appendix applies only to accidents where the ammunition has exploded or burned. When procedures in this appendix are inadequate, TB 9-1300-278 should be followed.

D-3. PREVENTION

The primary causes of vehicle fires are engines overheating and antennas striking trolley and railroad electric overhead cables. Antennas on vehicles must be tied down to a height below 13 feet (4 meters). Debris, organizational clothing and individual equipment, and other equipment must be stored according to loading plans to reduce combustible material.

D-4. IN CASE OF FIRE

a. In case of fire, the crew will—

(1) Evacuate the vehicle, attempt to shut down the engine, and close all hatches (if possible).

(2) Turn on fire-suppression systems.

(3) Notify the chain of command.

(4) Establish a safety perimeter according to b(3) below.

(5) Notify the local military community or host nation (HN) fire department.

(6) Coordinate actions with HN authorities for accidents occurring in areas not under U.S. control.

b. The battalion commander of the vehicle crew will—

(1) Have a fire-control officer (captain or higher in armor units) familiar with this appendix to implement and coordinate control, reporting, and disposal procedures. The fire-control officer or the relieving officer will remain in charge until the site is cleared by the USAREUR Radiation Safety Staff Officer (RSSO) or by the president of the USAREUR installation accident-investigation (IAI) board (UR 385-40).

(2) Limit access only to emergency-response personnel (for example, firefighters, explosive ordnance disposal (EOD) personnel, RSSO). The names and units of persons entering the safety perimeter must be recorded.

(3) Keep people as far away from the fire as possible. If hatches are closed, personnel will establish a safety perimeter of 60 meters (200 feet) to prevent injury from explosions. If the hatches are open or rounds are expelled, a safety perimeter of 300 meters (1,000 feet) is required. Access must be controlled for 20 meters (70 feet) from an accident site, when possible, when there is a smoke cloud.

(4) Evacuate injured people through medical channels. Medical attention for serious injuries takes precedence over decontamination (sec II). The battalion commander will alert medical personnel that injured victims may have been exposed to depleted uranium contamination.

(5) Not allow people into smoke without self-contained breathing apparatuses or, in an emergency, a field protective mask. Smoke may contain uranium oxides.

(6) Alert firefighters that ammunition involved in the fire may produce hazardous vapors and that respiratory protection is needed. Figure D-1 will be reproduced locally and carried by firefighters and drivers transporting hazardous cargo.

(7) Report the accident immediately through emergency channels to higher headquarters.

(8) Coordinate actions with HN authorities for accidents not under U.S. control.

FIREFIGHTING PROCEDURES FOR FIRE DEPARTMENTS

FIRES CONTAINING DEPLETED URANIUM AMMUNITION

1. When approaching the scene of a fire, prevent equipment and personnel from entering a smoke cloud.
2. High-intensity ammunition fires and small explosions must be expected. Ammunition smoke and fumes are toxic.
3. Do not fight fire when ammunition is directly involved in the fire or when rounds have been expelled. Fire trucks must be positioned at least 60 meters (197 feet) from armored vehicles with a closed hatch or 300 meters (985 feet) from armored vehicles with an open hatch.
4. Firefighters will wear self-contained breathing apparatuses. The recommended particulate-type protection for all other personnel involved is the M17A2 mask with the M13A2 filter element or the M25 with filter element.
5. Expose a minimum number of firefighters to the fire.
6. When ammunition is not involved in a fire in the crew compartment and the hatches are open, the fire should be fought with water stream, spray, or fog, using as much protective cover as possible.
7. If the engine is on fire, dry chemical, foam, or water should be used to extinguish the fire. Water is highly effective in cooling the engine and preventing the fire from affecting the ammunition.

Figure D-1. Firefighting Instructions (English and German)

BRANDBEKÄMPFUNGSVERFAHREN FÜR FEUERWEHREN

BRÄNDE IN PANZERN MIT ABGEREICHERTER URANKERNMUNITION

1. Bei Annäherung an die Brandstelle ist darauf zu achten, daß Fahrzeuge und Personal nicht direkt der Rauchwolke ausgesetzt sind.
2. Bei Munitionsbränden ist mit hoher Wärmeentwicklung und kleineren Explosionen zu rechnen. Dabei entstehender Rauch und die austretenden Dämpfe sind giftig.
3. Hat das Feuer die Munition bereits erfaßt oder wurde Munition herausgeschleudert, darf kein Löschversuch unternommen werden. Löschfahrzeuge dürfen in diesem Fall nicht näher als 60m an Panzer mit geschlossener Luke und nicht näher als 300m an Panzer mit offener Luke heranfahren.
4. Feuerwehrpersonal muss Druckluftbeatmungsgeräte tragen. Der empfohlene Schutz für alle anderen beteiligten Personen ist die Atemschutzmaske M17A2 mit den Atemschutzfiltern M13A2 oder M25.
5. Nur die unbedingt notwendige Mindestanzahl von Feuerwehrleuten sollte zur direkten Brandbekämpfung eingesetzt werden.
6. Wenn bei einem Brand im Panzerturm das Feuer die Munition noch nicht erfaßt hat und die Luken offen sind, soll mit Wasservollstrahl oder -sprühstrahl oder Sprühnebel gelöscht werden. Deckungsmöglichkeiten sollen soweit wie möglich ausgenutzt werden.
7. Wenn der Brand den Motorraum erfaßt hat, sollten nur Trockenpulver, Chemikalien, Schaum oder Wasser zum Löschen verwendet werden. Wasser kühlt den Motor schnell ab und verhindert ein Übergreifen des Feuers auf die Munition.

Figure D-1. Firefighting Instructions (English and German)—Continued

c. Brigade and area support group (ASG) or base support battalion (BSB) personnel will—

- (1) Notify local military and HN police to assist in site control.
- (2) Notify local fire, military, and civil officials, and alert firefighters that—

(a) Depleted uranium ammunition is present.

(b) Respiratory protection is needed.

(3) Request EOD support from the nearest EOD unit. Table D-1, paragraph 4, lists EOD POCs.

(4) Notify the division operations center and the division public affairs office.

(5) Assist with public affairs as directed by public affairs officers of USAREUR major subordinate and tenant commands (AE Reg 10-5, app A).

d. Division, regiment, ASG, and BSB personnel will—

(1) Notify the United States Army Installation Management Agency, Europe Region Office (IMA-Europe), or USAREUR major subordinate or tenant command operations center of the accident.

(2) Provide decontamination and cleanup assistance and assets to the chemical company, as needed (sec II).

(3) Assist with public affairs as directed by the USAREUR or tenant command public affairs office. Personnel will ensure the nearest public affairs officer is sent to the accident scene immediately.

(4) Investigate tank fires involving a fatality or \$1,000,000 or more in property damage (class A accident, AR 385-40) under the USAREUR IAI Program.

(5) Release control of the site to the IAI board president when the president arrives at the accident scene. The IAI board president will direct the security of the site and other tasks and will keep the commander informed of the investigation. At that point, responsibility for all matters will be transferred to the president of the IAI board.

e. The USAREUR major subordinate or tenant command or IMA-Europe command commander will—

(1) Notify the USAREUR Emergency Action Center (table D-1, para 1a).

(2) Notify his or her chemical officer of the possible need for equipment decontamination.

(3) Request his or her command safety manager and the RSSO to provide onsite radiation protection and safety support.

(4) Move the vehicle and material to a designated site for further decontamination in coordination with the Commanding General, 21st Theater Support Command; Commander, 1st Transportation Movement Control Agency; and the USAREUR RSSO.

(5) Appoint a public affairs officer to be the command spokesperson. Commanders may delegate this authority to the public affairs officer on the scene. Commanders will ensure the public affairs officer on the scene is briefed thoroughly and is knowledgeable about all aspects of the ammunition, vehicles involved, danger zones, and hazards.

f. The USAREUR Emergency Action Center will notify the—

(1) USAREUR Command Group.

(2) Safety and Occupational Health Office RSSO, Office of the Deputy Chief of Staff, G1, HQ USAREUR/7A.

(3) EOD Officer, Office of the Deputy Chief of Staff, G3, HQ USAREUR/7A.

(4) Chiefs, Supply Division, and Maintenance Division, Office of the Deputy Chief of Staff, G4, HQ USAREUR/7A.

(5) Chief, Public Affairs, USAREUR.

(6) Judge Advocate, USAREUR.

(7) Commanding General, 21st Theater Support Command.

(8) Commander, United States Army Center for the Health Promotion and Preventative Medicine-Europe (CHPPM-EUR).

(9) Army Calibration Laboratory (ACL), Nucleonics Division, United States Army Test, Maintenance and Diagnostic Equipment Region, Europe.

Table D-1	
Radiological Protection Points of Contact	
1. HQ USAREUR/7A:	
a. Emergency Action Center:	
(1) DSN: 370-7099/3238	
(2) Civilian: 06221-57-7099	
b. USAREUR RSSO:	
(1) DSN: 370-7751/8124	
(2) Civilian: 06221-57-7751	
c. Public Affairs:	
(1) DNS: 370-6936/9059/8739	
(2) Civilian: 06221-57-6936	
2. Radiation Protection Division, CHPPM-EUR.	
a. Duty hours:	
(1) DSN: 486-7038/7037/8118	
(2) Civilian: 06371-86-7038/7037/8118	
b. After duty hours: 486-8118 or 06371-86-8118	
3. USAREUR Radiation Control Officer:	
a. DSN: 484-7334	
b. Civilian: 0631-413-7334	
4. EOD units:	
a. 720th Ordnance Detachment (EOD) (Mannheim):	
(1) DSN: 384-6661/6658/6696	
(2) Civilian: 0621-730-6658/6696	
b. 702d Ordnance Detachment (EOD) (Grafenwöhr):	
(1) DSN: 475-8332/6238	
(2) Civilian: 09641-83-6238	
5. ACL:	
a. DSN: 495-6122/6486	
b. Civilian: 06331-86-6122	

g. The USAREUR RSSO will—

(1) Send reports to HQDA and the United States Army Materiel Command (AR 11-9 and AR 385-40).

(2) Provide radiological expertise on decontamination, site survey, and radioactive-waste collection and transportation.

h. The ACL will provide packaging for debris.

D-5. REPORTS

a. The battalion commander will notify HQ USAREUR/7A, through the chain of command, immediately of the accident.

b. The battalion commander will send a written report (AR 11-9) to the USAREUR Safety and Occupational Health Office, Unit 29351, APO AE 09014-9351, within 20 days after the accident. The report must explain details of the accident and corrective actions taken.

c. The USAREUR RSSO will report the accident to the United States Army Materiel Command within 24 hours after the accident.

d. The battalion commander or centralized accident investigation board president will send accident reports through command channels (UR 385-40).

e. An AR 15-6 commanders investigation is highly encouraged to support claims against the United States.

D-6. ONSITE ACTIONS AFTER THE FIRE

a. Medical personnel will evacuate people injured by fire. Serious injuries, burns, and broken bones should receive immediate medical attention before decontamination. Injured persons will be tagged "POSSIBLE DEPLETED URANIUM CONTAMINATION." Tags must be tied or otherwise attached to the injured persons.

b. No one will—

(1) Enter the tank before EOD personnel.

(2) Remove equipment.

c. The RSSO will mark and secure any debris expelled from the vehicle during the fire. The ACL will supply packing material for movement.

d. The Radiation Protection Division, CHPPM-EUR, will perform personnel monitoring, which may include bioassays to determine the amount of internal radioactive contamination to personnel.

SECTION II DECONTAMINATION AFTER DEPLETED URANIUM AMMUNITION VEHICLE FIRES

D-7. GENERAL

The procedures in this section were developed by the United States Army Tank-Automotive and Armament Command for handling vehicle fires when depleted uranium ammunition is involved and contamination is detected. These procedures will be implemented by division or corps chemical companies at the request of the onsite RSSO after firefighters extinguish the fire and EOD personnel declare the tank interior safe.

D-8. PROCEDURES

Nuclear, biological, and chemical (NBC) response teams (alpha teams) will—

a. Survey the area as directed by the HQ USAREUR/7A or the Radiation Protection Division representative. Identified contaminated areas should be roped off to prevent unauthorized entry. If no contamination is identified, NBC teams will place engineering tape 10 feet around the vehicle to control entry. Use of an AN/PDR-77 or equivalent detectors is acceptable in dry conditions. A pancake probe from an AN/PDR-77 (RSSO) kit is needed to survey wet surfaces. CHPPM-EUR personnel will use more sensitive detectors.

b. Survey the outside of the vehicle for contamination by wiping surfaces with paper towels, cloth, or other available material. NBC teams will check for contamination above background level on the paper towel with an AN/PDR-77 detector or its equivalent. If readings above background are present, teams will clean vehicles until contamination is reduced to background levels. Teams will use a paper towel, then take meter readings of the paper towel. The following are steps for cleaning vehicles:

(1) Damp-mop dry surfaces to remove dust and dry particles.

(2) Damp-wipe nonporous surfaces (for example, metal, plastic).

(3) Use water and detergent, saving the used liquid residue.

(4) Dispose of cleaning residue as radioactive material in metal containers. NBC teams will consult the USAREUR Radioactive Material Processing Facility for instructions on storing and stabilizing liquid radioactive residues. The ACL (table D-1, para 5) will provide containers.

c. After decontaminating the outside of the vehicle, seal openings to prevent escape of interior contamination to the environment.

d. Survey all personnel in the area with an instrument recommended by the USAREUR RSSO or by CHPPM-EUR personnel.

e. Decontaminate the inside of the tank at the retrograde facility.

f. Check both the roped-off area and the area under the tank for contamination.

g. Dispose of explosive ammunition components through EOD or ordnance channels. All other debris must be disposed of as radioactive waste.

D-9. TECHNICAL CONSIDERATIONS FOR DEPLETED URANIUM AMMUNITION VEHICLE FIRES

a. During a fire, depleted uranium produces both insoluble and soluble oxides. Failure to wear proper respiratory protection may expose the lungs to insoluble oxides. Handling bare depleted uranium without gloves exposes the skin to about 24 milligram per hour (beta/gamma). Persons not wearing protective glasses may receive low-level beta exposure to their eyes. In practice, exposures are generally low.

b. Inhaling oxides of uranium can injure kidneys. Medical personnel will take bioassay samples of persons possibly affected within 3 to 4 days to detect significant inhalation exposures. CHPPM-EUR will provide guidance for the bioassays (DSN 486-8369).

c. Oxides are suspendable and easily spreadable unless the oxides are moistened or other controls are used. Uranium oxides in the range of 0.1 micron to 10 microns take 30 to 120 minutes to fall 1 meter in the air.

d. Less than 1 percent of 105-millimeter rounds will oxidize in fire. The oxides are detectable with alpha, beta, and gamma instruments. Higher levels of oxidation may occur. Depleted uranium rounds that are 120-millimeter in size with combustible cartridge cases produce 50 to 100 percent ashing.

e. The proper respiratory protection for all firefighters is the self-contained breathing apparatus. The recommended particulate-type protection for all other personnel is the M40 or M17A2 protective mask with M13A2 filter element, and the accompanying headcover, or their equivalent.

APPENDIX E
APPROVED FAMILY OF SPACE HEATERS

SECTION I
FAMILY OF SPACE HEATERS

E-1. BENEFITS

a. The United States Army Soldier and Biological Command developed a family of space heaters (FOSH) using advances in combustion, power-generation, and microprocessor technology to provide comfort and protection for soldiers, supplies, and equipment in tents during cold-weather operations in the field. The FOSH will replace current M-1941 and Yukon heaters and eliminate the severe safety hazards and operational deficiencies that have existed over the past 50 years in the field.

b. Products from the FOSH program include a new, nonpowered burner technology that provides—

- (1) Clean, safe, efficient combustion of diesel and JP-8.
- (2) A new multiviscosity fuel-control providing accurate, multifuel operation in all temperatures.
- (3) A new thermoelectric fan to circulate hot air without electric power.
- (4) Integration of thermoelectric technology to provide single-switch, completely automatic, self-powered operation with forced hot air circulation.
- (5) Accessory equipment that includes a new fuelcan stand, gravity-feed adapter, and quick disconnect shut-off valves.

E-2. APPLICATIONS

Four heaters and a thermoelectric fan make up the FOSH (fig E-1) as follows:

- a. **Space Heater Arctic (SHA).** The SHA heats arctic tents.
- b. **Space Heater Convective (SHC).** The SHC heats modular command-post shelters.

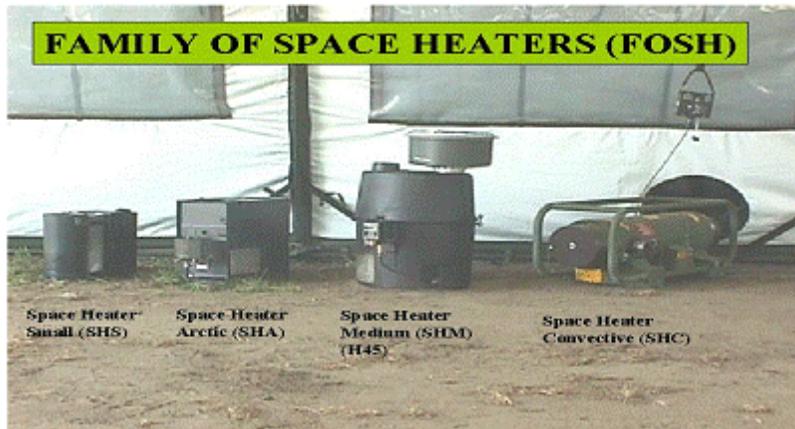


Figure E-1. FOSH

c. Space Heater Medium (SHM) or H-45. The SHM heats general-purpose tents.

d. Space Heater Small (SHS). The SHS heats five-soldier crew tents.

e. Thermoelectric Fan (TEF). The TEF is used with the SHA, SHM, and SHS to circulate heated air in tents.

E-3. CAPABILITIES

The advantages of the FOSH include the following:

- a. Operates without electric power.
- b. Multifuel operation (coal, diesel, JP5, JP8, kerosene, and wood).
- c. Efficient, clean-burning combustion requiring little maintenance.
- d. Operable in cold-weather conditions down to -60 °F.
- e. Self-contained, lightweight, portable, rugged, and simple to operate.
- f. Low cost.

**SECTION II
SPACE HEATER ARCTIC**

E-4. DESCRIPTION AND USES

a. The SHA (fig E-2) is a 28 thousand British thermal unit (28 kBtu) heater that is designed to provide heat for 10-person arctic tents and other tents with floor area between 100 and 200 square feet.



Figure E-2. Space Heater, Arctic

b. The SHA will replace the current Yukon heater, which has severe operational deficiencies and poses a serious safety hazard in the field. The SHA operates without electric power and can burn all types of liquid fuel (DF-1, DF-2, DF-A, JP5, JP8) and solid fuel (wood and coal)

(1) The SHA uses the new vaporizing S-tube burner technology, which overcomes the major combustion and safety problems that have existed for the past 50 years in the nonpowered heater industry. These problems include poor, smoky combustion of diesel fuel and the hazardous exposure of a pool of raw fuel during operation. The new vaporizing S-tube burner technology eliminates these deficiencies while maintaining simplicity, ruggedness, and low cost.

(2) All accessory components (including the preassembled, telescoping stovepipe) can be stored within the heater. This makes the SHA highly mobile and easy to assemble.

E-5. REMARKS

Preproduction prototypes have been constructed and production qualification testing (PQT) has been successfully completed.

E-6. FACTS

- a. National stock number (NSN): 4520-01-444-2375.
- b. Size: 16 inches high, 9 inches wide, and 16 inches long.
- c. Weight: 35 pounds, including all accessories (stack, flue cap, gravity feed adapter, hoses).
- d. Climate category: operational from -60 to 60 °F; storage at -60 to 160 °F.
- e. Use: arctic 10- and 5-person tents.

SECTION III SPACE HEATER CONVECTIVE

E-7. DESCRIPTION AND USE

a. The SHC (fig E-3) is a 35 kBtu thermoelectric heater that provides forced hot air circulation in military tents without the need for an external power supply. This eliminates the need for a field generator.

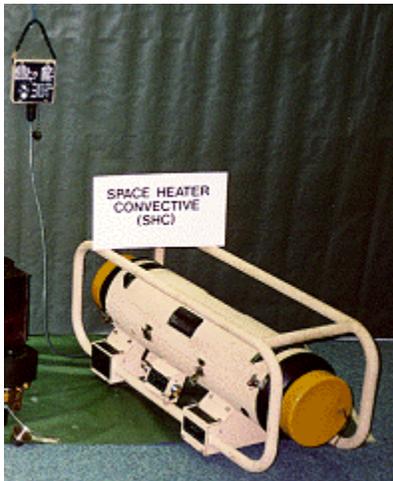


Figure E-3. Space Heater, Convective

b. The thermoelectric heater generates its own electric power (approximately 200 watts) by using thermoelectric modules in the combustion chamber. The modules convert the waste heat into electric energy. The electric current generated is used to power the blowers, pumps, ignition system, safety system, and control devices required to operate the heater.

c. The heater can be operated either inside or outside the tent and can burn many types of liquid fuels (DF-1, DF-2, DF-A, JP5, and JP8).

d. The heater is started with a single switch and operation is completely automatic due to built-in diagnostics, safety, and temperature controls.

e. The heater will provide a 60 percent increase in combustion efficiency over currently fielded nonpowered heaters and provide much cleaner combustion of diesel fuel. This will result in a significant reduction in fuel costs and maintenance requirements.

E-8. REMARKS

Preproduction prototypes have been built and PQT has been successfully completed.

E-9. FACTS

- a. NSN: 4520-01-431-8927.
- b. Size: 17 inches high, 14 inches wide, and 39 inches long.
- c. Weight: 67 pounds.
- d. Climate category: operational from -40 to 60 °F; storage at -60 to 160 °F.
- e. Use: modular command-post tents, tactical-operation commands, and other tents housing expensive electronics equipment.

**SECTION IV
SPACE HEATER MEDIUM****E-10. DESCRIPTION AND USE**

a. The SHM (fig E-4) is a 45 kBtu heater that is designed to provide heat for general purpose and temper tents. The SHM replaces the M-41 heater, which is antiquated, has severe operational deficiencies, and poses a serious safety hazard in the field.

b. The SHM operates without electric power and can burn all types of liquid fuel (DF-1, DF-2, DF-A, JP4, JP5, JP8, and gasoline) and solid fuel (coal and wood).

c. The SHM uses the new vaporizing R-tube burner technology, which overcomes the major combustion and safety problems that have existed for the past 50 years in the nonpowered heater industry. These problems include poor, smoky combustion of diesel fuel and the hazardous exposure of a pool of raw fuel during operation. The new vaporizing R-tube burner technology eliminates these deficiencies while maintaining simplicity, ruggedness, and low cost.

E-11. REMARKS

The SHM was successfully fielded in 1992.



Figure E-4. Space Heater, Medium

E-12. FACTS

- a. NSN: 4520-01-329-3451.
- b. Size: 24 inches high by 18 inches wide.
- c. Weight: 70 pounds, including all accessories (stack, flue cap, gravity feed adapter, hoses).
- d. Climate category: operational from -60 to 60 °F; storage at -60 to 160 °F.
- e. Use: all general-purpose tents (small, medium, and large) and temper tents.

SECTION V
SPACE HEATER SMALL

E-13. DESCRIPTION AND USE

a. The SHS (fig E-5) is a 12-kBtu heater that is designed to provide heat for the 5-person soldier crew tent and other tents with a floor area between 80 and 100 square feet.

b. The SHS meets the heating requirement for small military tents. The SHS operates without electric power and can burn all types of liquid fuel (DF-1, DF-2, DF-A, JP5, JP8).



Figure E-5. Space Heater, Small

(1) The SHS uses the new vaporizing S-tube burner technology, which overcomes the major combustion and safety problems that have existed for the past 50 years in the nonpowered heater industry. These problems include poor, smoky combustion of diesel fuel and the hazardous exposure of a pool of raw fuel during operation. The new vaporizing S-tube burner technology eliminates these deficiencies while maintaining simplicity, ruggedness, and low cost.

(2) The integral fuel tank design eliminates need for hoses, gravity-feed adapter, fuel can, and fuel can stand.

E-14 REMARKS

Initial design prototypes were successfully tested in the climatic chambers at the United States Army Soldiers System Center.

E-15. FACTS

- a. NSN: 4520-01-478-9207.
- b. Size: 14 inches high, 8.5 inches wide, and 14 inches long.
- c. Weight: 19 pounds, including all accessories
- d. Climate category: operational from -60 to 60 °F; storage at -60 to 160 °F.
- e. Use: soldier crew tent.

SECTION VI THERMOELECTRIC FAN

E-16. DESCRIPTION AND USE

a. The TEF (fig E-6) is designed for use with standard military heaters to produce—

- (1) More uniform heating of the shelter and provide more comfortable living and working conditions.
- (2) Improved health and morale.
- (3) Significant fuel savings.



Figure E-6. Thermoelectric Fan

b. The TEF is a compact, lightweight, ruggedly designed unit that is simply set on top of the heater when in use. It has a built-in thermoelectric module that converts heat from the stove into electricity to power a 450-cubic feet per minute fan. The fan blows air downward over the heater to the bottom of the tent, thus improving air circulation and providing for more even distribution of heat throughout the entire shelter. Improved heating performance as a result of the circulating fan allows operating the burners at lower outputs, which reduces fuel consumption.

E-17. REMARKS

Final units were built and successfully tested with the SHA and SHS in a PQT. The TEF is type classified with the SHA and SHS.

E-18. FACTS

- a. NSN: 4520-01-457-2790
- b. Size: 10 inches high by 12 inches wide (diameter).

- c. Weight: 12 pounds.
- d. Climate category: operational from -60 to 60 °F; storage at -60 to 160 °F.
- e. Use: nonpowered tent heaters (SHA and SHM).

GLOSSARY

SECTION I ABBREVIATIONS

ACL	Army Calibration Laboratory, Nucleonics Division, United States Army Test, Measurement, and Diagnostic Equipment Region, Europe
ADR	<i>Accord Européen relatif au Transport International des Marchandises dangereuses par Route</i>
AE	Army in Europe
AGAR	abbreviated ground accident report
ANSI	American National Standards Institute
AR	Army regulation
ASG	area support group
ASP	ammunition supply point
B-LPS	ballistic laser protective spectacle
BSB	base support battalion
CFM	cubic feet per minute
CFR	Code of Federal Regulations
CHPPM-EUR	United States Army Center for Health Promotion and Preventative Medicine-Europe
CN	chloroacetophenone (a riot-control agent commonly called “tear gas”)
CO2	carbon dioxide
COTS	commercial off-the-shelf
CPR	cardiopulmonary resuscitation
CS	0-chlorobenzal malononitrite (a riot-control agent commonly called “tear gas”)
CUCV	commercial utility cargo vehicle
DA	Department of the Army
DOD	Department of Defense
DPW	directorate of public works
ECWCS	extended cold weather clothing system
EOD	explosive ordnance disposal
FM	field manual
FOSH	family of space heaters
G1	Deputy Chief of Staff, G1, USAREUR
G3	Deputy Chief of Staff, G3, USAREUR
GVW	gross vehicle weight
HAZMAT	hazardous material
HC	hexachloroethane
HEMTT	heavy expanded mobility tactical truck
HET	heavy equipment transporter
HIRTA	high-intensity radio transmission area

HMMWV	high mobility multipurpose wheeled vehicle
HN	host nation
HQDA	Headquarters, Department of the Army
HQ USAREUR/7A	Headquarters, United States Army, Europe, and Seventh Army
HVCP	hazardous vehicle certification permit
IAI	installation accident investigation
IBD	inhabited building distance
IMA-Europe	United States Army Installation Management Agency, Europe Region Office
IMC	instrument meteorological conditions
ISO	International Standards Organization
kBtu	thousand British thermal unit
kph	kilometers per hour
LBE	load-bearing equipment
LN	local national
MEDEVAC	medical evacuation
MILVAN	military-owned demountable container
mm	millimeter
MOPP	mission-oriented protective posture
MOUT	military operations on urbanized terrain
mph	miles per hour
MRE	meal, ready-to-eat
MTA	major training area
MTF	medical treatment facility
MTPP-E	Military Traffic Management Command Personal Property Office-Europe
NATO	North Atlantic Treaty Organization
NBC	nuclear, biological, and chemical
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NEQ	net explosive quantity
NMC	not mission capable
NOHD	nominal hazardous distance
NSN	national stock number
NTV	nontactical vehicle
NVD	night vision device
OIC	officer in charge
OSHA	Occupational Safety and Health Act
PC	pilot in command
POL	petroleum, oils, and lubricants
POV	privately owned vehicle
PQT	production qualification testing
PTR	public traffic route

QASAS	quality assurance specialist (ammunition surveillance)
RAWL	rotating amber warning light
RF	radio frequency
RSSO	radiation safety staff officer
SHA	space heater arctic
SHC	space heater connective
SHM	space heater medium
SHS	space heater small
SOP	standing operating procedure
STANAG	standardization agreement
TB	technical bulletin
TDA	tables of distribution and allowances
TEF	thermoelectric fan
TEV	trail escort vehicle
TM	technical manual
UL	Underwriters Laboratories
U.N.	United Nations
UP	USAREUR pamphlet
UR	USAREUR regulation
U.S.	United States
USAREUR	United States Army, Europe
USEUCOM	United States European Command
VB	vapor barrier
VFR	visual flight rules
WBGH	wet bulb globe temperature

SECTION II TERMS

convoy

Three or more vehicles moving under a single commander from the same point of origin.

dunnage

Any material (boards, planks, blocks, pneumatic pillows) used to support or secure supplies in storage or while in transit.

lead vehicle

An Army wheeled, motor vehicle used as a lead escort vehicle.

march column

Consists of all elements using the same route for a single movement of troops.

march unit

Unit that moves and halts at the order of a single commander. The march unit normally corresponds to one of the smaller troop units such as a squad, section, platoon, company, or battery.

microwave and radio frequency radiation

Electromagnetic radiation within the frequency range of 10 to 300,000 megacycles per second or megahertz with corresponding wavelengths of 30 meters to 1 millimeter.

residual risk

The level of risk after controls have been identified and selected for hazards that may result in loss of combat power.

supercargo

Individuals accompanying cargo on a nonpassenger cargo transport for purposes of security surveillance, technical escort, or other official duty purposes.

trail escort vehicle

An Army motor wheeled vehicle weighing 2½ tons or more positioned at the end of a convoy.