

**CFLCC (US Army) Training Circular 21-305-4.1
CFLCC (USAF) Pamphlet 91-208(I)
CFLCC (USN) Instruction 5101.3A**

**Coalition Forces Land Component Command (CFLCC)
Interservice Publication (IP):
Safety**

**Tactics, Techniques and
Procedures (TTPs),
Program of Instruction
(POI), and Crew/Battle
Drills for the High
Mobility Multipurpose
Wheeled Vehicle
(HMMWV) Egress
Assistance Trainer
(HEAT)**

**Headquarters
Coalition Forces Land Component Command (CFLCC)
Camp Arifjan, Kuwait
APO AE 09306
27 February 2006**

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(2) review the Risk Management Worksheet developed for the HEAT, and make any local expansions necessary for compatibility with the Unit Mission Essential Task List (METL) (see appendix F);

(3) ensure the Preventive Maintenance Check Services (PMCS) and prescribed maintenance have been performed (see appendix G);

(4) ensure parity between the HEAT and the HMMWV operational fleet as new equipment for the HMMWV is fielded (e.g., a Gunner's Restraint Harness – see paragraph 1-1e).

(5) ensure evidence of motion discomfort is policed IAW paragraph 3-2; and

(6) ensure completion of training records IAW paragraph 3-12.

f. The **Unit Master Driver Trainer** will be the functional Officer in Charge (OIC)/Noncommissioned OIC (NCOIC), working with technical input from the (other) uniformed members and/or contractors on site.

Chapter 2

HEAT Data and Training Requirements. This chapter delineates the basic and up-armored HMMWV characteristics, the required training equipment and aids, provides an overview of the training, and establishes priorities for use of the device.

2-1. M1114 HMMWV Data:

- a. Curb weight: 9,800 pounds (lbs.)/4,447 kilograms (kgs).
- b. Payload: 2,300 lbs./1,043 kgs.
- c. Gross Weight: 12,100 lbs./5,489 kgs.
- d. Armored HMMWV door weight: 240 lbs./109 kgs.
- e. Max towed load: 4,200 lbs./3,175 kgs.
- f. Maximum safe speed depends on surface conditions. Never exceed posted speeds.
- g. Critical HMMWV angles:

(1) Technical Manual (TM) 9-2320-280-10 (Operator's Manual for M998 through M1035), para. 1-9c indicates a fully-loaded M998 through M1038 HMMWV will traverse a side-slope of up to 22°. And, according to TM 9-2320-387-10 (Operator's Manual for M1113 and M1114), para 1-10b, this angle is only 17°. Practical experience from the CFLCC AOR, however, indicates an M1114, with a normal center of gravity (cg) and normal load, can in fact operate on side-slopes of up to 30°.

Note: It is never advisable to exceed the limitations specified in the Operator's Manual for any vehicle.

- (2) The critical rollover angle for a Combat Patrol-loaded M1114 is less than 30°.
- (3) The critical rollover angle for an up-armored HMMWV is 25° – less with higher-cg loads. See figure 2-1.

2-2. HEAT-specific data:

- a. Rotational speed: 180° turn target speed: Approximately six seconds empty; seven-to-nine seconds loaded.
- b. HEAT approximate weight (for transport and floor planning purposes): 10,000 lbs. The M879 lowboy trailer (mover) weighs 19,000 lbs.

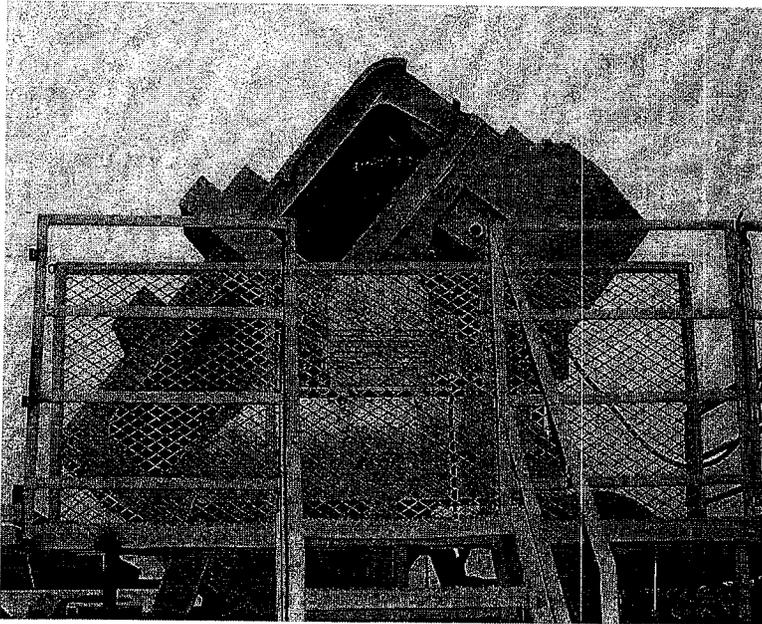


Figure 2-1. The Up-armored HMMWV critical rollover angle is 25° – less with higher-cg loads.

c. Approximate manufactured cost for the HEAT is 10,000 U.S. Dollars.

2-3. Required Equipment and Training Aids (in addition to paragraph 2-4):

a. Graphic Training Aid (GTA) 55-03-030 (HMMWV Uparmored Emergency Procedures Performance Measures);

b. Modified Table of Organization and Equipment (MTOE)/Table of Distribution and Allowances (TDA)/Organizational Clothing and Initial Issue Equipment (OCIE) personal combat uniform and equipment;

c. HEAT (device) – including padding for beneath device (see paragraph 3-10d);

d. rubber mallet (to seat the troop stands in the device during setup);

e. whistle, air horn or similar signal device;

f. HEAT Written Tests and answer sheets (see appendix H);

g. Combat Lifesaver (CLS) and lifesaver/first aid equipment;

h. for motion distress:

- (1) shop (wet/dry) vacuum;
- (2) hose and water source;
- (3) (at least two) one-gallon pails;
- (4) latex (or equivalent) gloves;
- (5) shop rags/towels; and
- (6) a self-closing trash can, and plastic trash bags;

i. recommended knee- and elbow-pads (flailing and egress injury abatement);

j. safety glasses or goggles (mandatory for eye injury abatement);

k. fire extinguisher (Class A, B, C – at least 10 lb.);

l. flashlights (at least two);

m. Styrofoam blocks (simulated ammo cans, cargo, etc.);

n. paper bags (see tables 4-1 and 4-2); and

o. Hazardous Material (HAZMAT) pigs or sorbent material with which to recover any oils, greases, or organic compounds having leaked or dripped from the simulator, or been expelled from a crewmember.

p. When not used with building-supplied power, an external generator (at least ten kilowatts [kw]), a grounding stake and a sledge will also be required (see TC 11-6 [Grounding Techniques]).

2-4. Training Uniform. HEAT Training participants will report to HEAT training with boots, Class C uniform, and protective eyewear (mandatory) they would normally wear when participating in vehicular operations – including their

CERTIFICATE OF QUALIFICATION

1. NAME (Last, First, Middle Initial)	2. ORGANIZATION
3. TITLE	4. SPEC/STANDARD
5. NAME OF CERTIFIER (Last, First, Middle Initial)	
6. SIGNATURE	7. DATE (YYYYMMDD)
8. EXPIRATION DATE (YYYYMMDD)	9. CARD NO.
10. REMARKS	

DD FORM 1902, MAY 91

Previous edition may be used.

Figure 3-1. The DD Form 1902 is issued in addition to the OF 346 as unique evidence of the qualification of a HEAT Examiner

c. The initial/annual evaluation will determine the HEAT Operator's ability to train other personnel and perform essential tasks to the prescribed standards. HEAT Examiners may evaluate HEAT Operator(s) by observing the performance of the prescribed duties or by functioning as a crewmember undergoing HEAT training by the HEAT Operator, in order to evaluate the effectiveness of the HEAT Operator's instruction.

d. HEAT Operators and HEAT Examiners will be certified IAW paragraph 3-12 above. In addition, HEAT Examiners will be issued a DD Form 1902 (Certificate of Qualification) as unique evidence of their qualification and designation (see figure 3-1).

Chapter 4

HEAT Learning Objectives and POI. This chapter outlines the basic and detailed training criteria for the

HEAT, and guidance for adapting this training into operations and missions involving the HMMWV.

4-1. Basic lesson plan and HMMWV crew review material – Set-up (see appendix I) and Pre-Operational use inspection of the HEAT (see appendix G):

- a. Demonstrated rollover of device while empty – observing rollover rate, and checking for free-floating and unsecured obstacles within the device.
- b. Check the taped-off stay-clear area around and beneath the HEAT is clear, and only authorized personnel are within the clear area during HEAT operation.
- c. Inspect the seatbelts and restraints for condition and security, and ease of operation at each position in the HEAT.
- d. Check the motor controls and electrical connections of the HEAT to the building electrical outlet are secure and serviceable.
- e. The senior HEAT Instructor on duty will endorse the logbook for the device that the daily and before-use checks have been completed, and no weekly, monthly, quarterly or annual inspections/services are overdue.

4-2. Terminal Learning Objective (TLO). As a HMMWV crewmember, perform inspection, clearing, and egress procedures with the HEAT while wearing required combat equipment and adhering to applicable safety precautions and procedures outlined in this POI.

a. Overview and general scheme of training.

(1) Training in the HEAT is normally conducted in phases, as described in paragraph 4-4 and table 4-1 – a **Primary** phase, an **Intermediate** phase, and an **Advanced** phase. Refresher training (as described in paragraph 2-5d) entails recurrence based upon the Advanced phase, as described in paragraph 4-5a.

(Table 4-1 and subsequent text continued on next page.)

Table 4-1

HEAT Phase and Crew/Battle Drill Descriptions

HEAT Phase	Crew/Battle Drill Descriptions
<p>Primary <i>(Crawl)</i></p>	<ol style="list-style-type: none"> 1. The first drill is for familiarization, pausing to highlight the 30- and 25-degree critical rollover angles. 2. The second drill shall be a “dry run” – completely rolling over (inverted) – no actual release of the seatbelts or gunner’s harness will be made. 3. The third will entail inverting the device, and participants actually exiting the device, as though it had rolled on dry land. 4. After righting the device, crew rotating seats and re-entering the device – the fourth drill will entail inverting the device, simulating a water entry.
<p>Intermediate <i>(Walk)</i></p>	<ol style="list-style-type: none"> 1. The first drill is a “dry run” – completely rolling over (inverted) – no actual release of the seatbelts or gunner’s harness will be made. 2. The second drill will entail inverting the device, and participants actually exiting the device, as though it had rolled on dry land. 3. After righting the device, crew rotating seats and re-entering the device – the third drill will entail inverting the device, simulating a water entry. 4. After righting the device, crew again rotating seats and re-entering the device – the fourth drill will entail darkening the room in which the device is operated, then inverting the device, simulating a rollover at night on dry land.
<p>Advanced <i>(Run)</i></p>	<ol style="list-style-type: none"> 1. The first drill will entail inverting the device, and participants actually exiting the device, simulating a water entry. 2. After righting the device, crew rotating seats and re-entering the device – the second drill will entail darkening the room in which the device is operated. The instructor will pop a paper bag, simulating an explosion. The device will then be inverted, simulating a rollover at night on dry land. 3. The third drill will be as the second, except with the introduction of Styrofoam blocks to simulate ammo cans and debris in the vehicle – as is typical in a typical convoy or tactical mission. This drill will simulate a night water immersion, and the right front door cannot be opened. 4. The final drill will be as the third, except with the introduction of a wounded gunner with a simulated broken neck and back, who must be extracted from the night water immersion.
<p>Refresher/Recurrence</p>	<ol style="list-style-type: none"> 1. The first drill is a re-familiarization ride, pausing to highlight the 30- and 25-degree critical rollover angles. 2. The second drill will entail darkening the room in which the device is operated. The instructor will pop a paper bag, simulating an Improvised Explosive Device (IED) or a blown tire. The simulator will then be inverted, simulating a rollover at night on dry land. 3. After righting the device, crew rotating seats and re-entering the device – the final drill will be as the second, except: <ol style="list-style-type: none"> a. The introduction of Styrofoam blocks to simulate ammo cans and debris in the vehicle – as is typical of most convoy or tactical missions; b. a simulated night water immersion; c. the right front door cannot be opened; d. the Gunner has notionally suffered a gunshot wound to the chest, and is immobile; and e. the Vehicle Commander (right front seat) has lost their right leg below the knee, and is bleeding profusely.

Note: Units should man the HEAT in training IAW their Standing Operating Procedure (SOP) as they would conduct combat convoy escort patrols (i.e., if the unit training in the HEAT has combat convoy escort patrols as one of their METL tasks, and their SOP directs only a driver, Vehicle Commander [VC] and gunner in the vehicle, then their training should not include a back-seat crew during HEAT training).

(2) As determined and requested by the Commander, units may opt to perform the Primary, Intermediate and Advanced Phases of training in the same session – depending on availability of the device, METL of the unit being trained, etc. Since table 4-1 assumes a certain lapse of time between each phase, certain accommodations should be made in the POI to reflect this accelerated approach. The HEAT Instructor and Master Driver Trainer are afforded discretion and operational flexibility in making such accommodations, and an adjusted POI is reflected in table 4-2 below.

(Table 4-2 and subsequent text continued on next page.)

Table 4-2

Consolidated/Accelerated HEAT Crew/Battle Drill Descriptions

HEAT Phase	Crew/Battle Drill Descriptions
<p>Consolidated/Accelerated</p> <p>Primary (Crawl), Intermediate (Walk), and Advanced (Run).</p>	<ol style="list-style-type: none"> 1. The first drill is a familiarization ride, pausing to highlight the 30- and 25-degree critical rollover angles. 2. The second drill shall be a “dry run” – completely rolling over (inverted) – no actual release of the seatbelts will be made. 3. The third will entail inverting the device, and participants actually exiting the device, as though it had rolled on dry land. 4. After righting the device, crew rotating seats and re-entering the device – the fourth drill will entail inverting the device, simulating a water entry. 5. After righting the device, crew rotating seats and re-entering the device – the fifth drill will entail darkening the room in which the device is operated. The instructor will pop a paper bag, simulating an explosion. The device will then be inverted, simulating a rollover at night on dry land. 6. The sixth drill will be as the second, except with the introduction of Styrofoam blocks to simulate ammo cans and debris in the vehicle – as is typical of most convoy or tactical missions. This drill will simulate a night water immersion, and the right front door cannot be opened. 7. The final drill will be as the sixth, except with the introduction of a wounded gunner with a simulated broken neck and back, who must be extracted from the night water immersion.

(3) Each training phase is comprised of four **stages**, as depicted in figure 4-1: Academics, Observation, Training, and Debrief. Each stage entails five HEAT Training participants and one instructor. While training with the HEAT is generally event-driven, approximate times in each stage are denoted in figure 4-1.

(a) Total cycle time for the HEAT is conservatively one hour and 35 minutes (for table 4-1; table 4-2 will require slightly more time, based on the event-driven training performed by the HEAT Instructor).

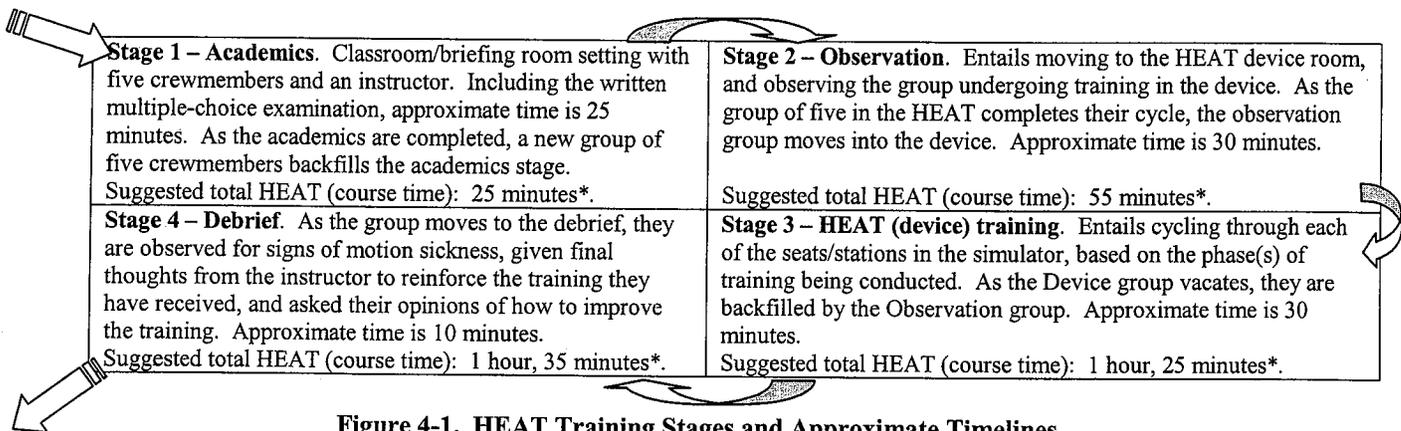


Figure 4-1. HEAT Training Stages and Approximate Timelines

Note: (From * above) Stage 1 may be completed prior to arrival at the HEAT device IAW paragraph 4-2a(2)(b) and appendix J, effectively reducing total cycle time to one hour ten minutes. Approximately ten minutes should be added to stage 2, when this is the case, for a safety briefing prior to boarding the device.

(b) Provided the Academic portion of the training in stage 1 is completed prior to arrival at the device (as certified IAW appendix J), total cycle time for the HEAT is (then) conservatively one hour and 20 minutes – allowing for a Safety briefing in stage 2 prior to boarding the device.

(c) As a crew cycles out of stage 1, they rotate to stage 2, etc. Units and organizations involving more than five HEAT Training participants rotate their crew into the cycle in groups of five.

(d) The same instructor should rotate through the entire HEAT cycle with the same team, allowing for continuity and consistency in the training and concepts presented during each stage.

(4) Cycle times are consistent for each phase of training.

(a) The completion of academics from any phase of training satisfies the academic prerequisite for any hands-on device training for one year.

Note: For purposes of this TC, and unless otherwise distinguished, the terms *Trainer*, *Device*, and *Simulator* are synonymous.

(b) When graduating from one phase to another, the corresponding cycle times are adjusted IAW paragraph 4-1a(2)(b).

b. **Total HEAT cycle:** Approximately one hour and 35 minutes (95 minutes).

c. **Total HEAT participants** in a given ten-hour duty day (discounting an hour for lunch): About 100.

d. **Total HEAT Instructors required:** Four – one in academics, two on the HEAT device floor, and one in debrief.

e. **Minimum HEAT Instructors required** to safely conduct training: Two – one in academics, one on the HEAT device floor (debrief functions shift between the floor instructor and the academics instructor). If operating two HEAT devices in the same hangar/building, at least three instructors are required, since one can perform the academics for both devices; an instructor with each device; and debrief functions alternating between the instructors.

Note: The senior HEAT Instructor may augment (not substitute) the cadre with the use of safety observers – briefed to perform that function – from observers waiting to ride in the device, or those crewmembers who have already undergone training in the device.

4-3. **Academic phase learning objectives.** Students will be able to state and/or describe procedures relating to the following subjects: a) Proper pre-drive checks for the HMMWV (as they relate to the HEAT); b) clearing the HEAT/HMMWV upon egress; c) check for injuries; and d) removing injured personnel, and accountability of personnel upon egress.

a. Students are encouraged to have completed:

(1) Selection, training, testing and licensure in an Army Motor Vehicle (AMV)/Utility Service vehicle – preferably the HMMWV – IAW DODI 6055.4, AR 600-55, AFI 91-207, or MCOs 5100.19, and 5110.1.

(2) The *Accident Avoidance Course* – available on Army Knowledge Online (AKO) (www.us.army.mil) – or equivalent course, prior to undergoing training in the HEAT. This academic foundational instruction serves as a sound prerequisite for advanced driving skills taught in –

(3) a hands-on course such as the *Safe Driver Training Program* prior to attending the HEAT. This course – sponsored by ASG-Kuwait, and conducted by contracted instructors – is best seen as an effective prerequisite in learning how to avoid rollovers and rollover conditions in the HMMWV.

(4) It is desirable to have completed the HEAT Academics prior to arrival at the device IAW paragraph 4-2a(2)(b), and appendix J.

b. In a classroom with appropriate training aids available, instruction shall be provided on the inspection, use and safety features of the HEAT. Video presentations may be used in conjunction with instruction.

c. Practical exercises shall be completed in the classroom with each HEAT Training participant demonstrating the inspection and deployment of the HEAT. Each participant will pass a written test (appendix H) on the operation of the HEAT and egress procedures. A minimum score of 80% (minimum) is required prior to attending the performance phase of training.

d. Before using any HEAT device, HMMWV crewmembers will be trained IAW this POI – particularly those portions that outline training, qualification, and recurrence/refresher. Persons completing a comparable formal course of instruction for HEAT qualification, that meets all the criteria in this POI, may be certified at the commander's discretion.

4-4. **HEAT Performance phase learning objectives.** Understand preventive measures to preclude rollover.

a. Combat door locks on the M1114 Up-armored HMMWV keep the enemy out. When locked, they make it extremely difficult for rescuers to enter the vehicle. Commanders should determine when combat locks should be used when conducting operations near bodies of water. Also, consideration must be given to the inherent difficulty in opening an unlocked armored door – since it was not designed to swing on an inverted hinge – and the risk added to the assessment for such operations. See figure 4-2.

(1) Accident damage may also jam doors, making them impossible to open.

(2) If the doors cannot be opened and the vehicle is in water too deep to allow air in the vehicle, the likelihood of drowning is significantly elevated. In this case, rescuers must immediately roll the vehicle on its side using all available means (tow straps, rope, winch cables, etc.) to gain access to the turret.

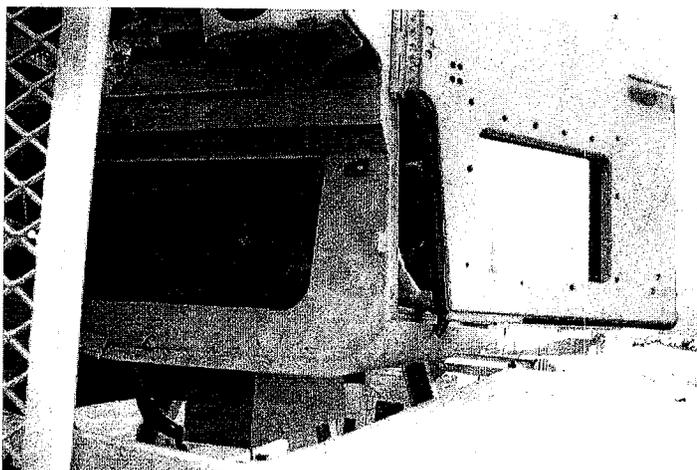


Figure 4-2. The armored door was not designed to swing on an inverted hinge – an added risk for such operations.

b. **Preventive measures.**

Note: Never attempt to jump from a rolling vehicle. It may roll over you. Ensure the vehicle has stopped rolling before exiting. Upon complete evacuation of the crew, vehicle should be inspected for fire hazards such as leaking oil, fuel, ammunition and hydraulic fluid. If hazardous/explosive materials are involved, the driver must take actions according to the DD Form 836 (Dangerous Goods Shipping Paper/Declaration and Emergency Response Information for Hazardous Materials Transported by Government Vehicles) accompanying the load. Notify rescue personnel and remain a safe distance while securing the accident site.

(1) **Slow down.** Watch for sharp curves and steep slopes. Curves and slopes generate centrifugal forces that act sideways on the vehicle, increasing the chance of rollover.

(2) **Avoid panic** – don't jerk the steering wheel. Many rollovers occur when the driver panics and/or jerks the steering wheel during an emergency. At highway speed, jerking the steering wheel can cause loss of control and the vehicle may slide sideways and roll over.

(3) **Know proper maneuvering.** If you drive off the roadway, gradually reduce speed. Ease your vehicle back onto the roadway at a safe speed.

(4) **Use caution** on rural roads, or roads with soft or no shoulders. When a vehicle goes off a road, the vehicle can overturn when it strikes a ditch or embankment, or is tripped by soft soil or a failed tire sidewall.

(5) **When in the vicinity of water** and tactical conditions permit:

- (a) Reduce speed and stop vehicle;
- (b) inform crewmembers that you are operating around potential water hazards;
- (c) make a Risk Assessment of the terrain and route before proceeding;
- (d) maintain orientation by wearing seatbelts; and
- (e) unlock combat door locks.

c. **Pay attention to vehicle condition, tire pressure and loading.**

(1) Pay particular attention to tire condition and air pressure during each PMCS to reduce potential hazards. Worn or improperly inflated tires increase your risk of rollover.

(2) Don't overload the vehicle. The M1114 payload is 2,300 lbs./1,043 kg. This includes the passengers, winch, gunner's protection kit, spare tire, weapons, and all cargo.

(3) Keep the vehicle cg low. Load heavier items low in the vehicle, or to the upslope side. Increasing the height of your vehicle cg increases your risk of rollover.

(4) Secure the load. Improperly secured loads can shift and become hazards within the vehicle and increase the chance of rollover.

(5) Slow before cresting a hill. It is impossible to tell what is on the other side of the crest. Consider sounding the horn in such circumstances, and tend to the right side of the road as conditions permit. Be prepared to crest the hill and find a vehicle stopped in your path – or worse, on a collision course in your lane.

(6) Trailer towing. Vehicles towing trailers are much more prone to rollover, especially in curves and during sudden steering maneuvers, as a result of exaggerated motion of the trailer. Adjust speed accordingly.

d. Work as a Team: Maintain Crew Integrity – train as a team.

(1) Communicate with the driver – tell the driver what is to the left, right, rear and overhead. Your gunner is your eyes and ears. The gunner may be the only crewmember capable of seeing around the entire vehicle (see figure 4-3).



Figure 4-3. The gunner may be the only crewmember capable of seeing around the entire vehicle.

Use the vehicle intercom system to pass visual information to the driver, but rehearse shouted voice commands and hand signals in case the intercom is inoperative. Avoid hazards, use a ground guide whenever practicable. The gunner must remain in *nametag defilade* IAW FM 21-305 (Manual for the Wheeled Vehicle Driver), TC 21-305 (Training Program for Wheeled Vehicle Accident Avoidance), TC 21-305-4 (Training Program for the High Mobility Multipurpose Wheeled Vehicle), and TC 21-306 (Tracked Combat Vehicle Driver Training).

Note: Of all the vehicle occupants, the likelihood of injury to the gunner is disproportionately higher than those of the others. Knowing the fundamental purpose of the HEAT, those occupying the gunner position must exercise particular diligence in securing occupant restraints, bracing for the rollover, and be particularly mindful of the increased potential for head and neck injuries – even in the device. Further, those occupying the gunner

position in the HEAT must verify prior to each rollover iteration that the gunner hatch locking mechanism remains secure, and to avoid inadvertent disengagement of the lock during each rollover (see figure 4-4).

(2) Wear seatbelts. Survive the rollover!

(3) **During the roll:**

(a) **The driver drives.** Continue to navigate the vehicle as long as the controls of the vehicle influence and direct its path and speed.

(b) **The gunner must slip out of the gunner's seat,** attempting to retract into the cab of the vehicle as quickly as possible. While this action doesn't eliminate the bouncing around inside the vehicle, it substantially reduces the likelihood of decapitation, and puts the rollage of the vehicle between the gunner and the accident site.

(c) **All others in the vehicle must make a grab for the gunner**, assisting them as abruptly as necessary to get into the cab of the vehicle as quickly as possible.

(4) Use combat locks – safely. Combat locks help keep the doors closed in a crash, but are often a hazard near water. Unlock combat door locks when near water (enemy situation permitting).

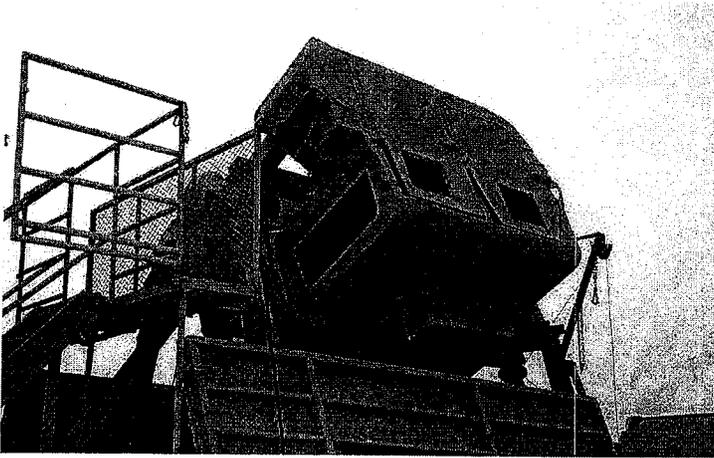


Figure 4-4. The gunner must verify prior to each rollover iteration that the gunner hatch locking mechanism remains secure.

(5) Know how to get out. Rehearse vehicle evacuation as if only one exit is available. **Actual egress entails:**

(a) **BRACE** with one hand against the floor (what *was* the ceiling).

(i) Consider which hand you should brace with (figure which hand can reach your seatbelt, and use the other one to brace).

(ii) Do not unlatch your seatbelt without bracing on the floor – your neck cannot support your body weight, let alone with all the *battle rattle* you have on.

(b) **UNFASTEN** your seatbelt with your other hand.

(i) Push against the floor with your bracing hand to release the tension on the seatbelt so it will unfasten.

(ii) Find the release button and press it firmly until it pops loose.

(iii) Be prepared to fall when the belt unlatches. Tuck your head, and protect your neck at all costs.

(c) **SLIDE** out of your seat, being sure to **disconnect your headset**.

(i) Remember that you cannot open the door while inverted.

(ii) Be aware of your buddies and don't kick them in the face.

(iii) Muzzle awareness at all times.

(iv) Be aware your gear may get caught on something.

(d) **ORIENT** yourself on the door.

(i) Dropping out of your seat is more disorienting than expected.

(ii) Get yourself right side up before worrying about the door.

(iii) Look at the door – consider how it will open now that it is inverted.

(e) **UNLOCK AND OPEN** the door. If it doesn't open, find a door that works. Recall whether your vehicle is one with two-stage combat locks or one-stage, and the differences it takes to open each.

(i) Armored doors weigh 240 pounds each, and are not meant to be inverted.

(ii) The door may be difficult or impossible to open.

(iii) Once the latch is open, you will have to really lean into the door to get it open. However, if your door is not opening, try another door!

(iv) When you open a door, shout "Open door (*and the location*)!"

(f) **GET OUT**, but don't let your buddy down.

(i) Determine if all crewmembers are aware of the open door, and whether they are moving toward it.

(ii) Determine if all crewmembers are conscious.

(iii) Consider the risks of moving injured soldiers – don't make the situation worse, but you can't leave them hanging upside down, nor there to drown.

(iv) Look before you leap – don't rush out the first door, only to fall off a cliff, or thrust yourself into a burning fuel or oil slick.

(6) The Gunner's egress entails some specific and additional steps:

(a) Slide feet to the direction of roll, as the torso and legs are withdrawn to present the lowest possible profile.

(b) Depending on how the rear seats are occupied:

(i) When both rear seats are occupied, both rear seat occupants will maintain a firm grasp on the gunner, pulling the gunner down inside the vehicle through the turret – assisting in restraining the gunner throughout the rollover until the vehicle has come to a stop.

(ii) If only one rear seat is occupied, the back seat occupant will pull the Gunner toward them, much as described above.

(c) Unlatch the gunner's lanyard/harness, and egress.

e. As with any military operation, once the situation permits, report the mishap IAW AR 385-40, AFI 91-204 (Safety Investigation and Reports), MCO P5102.1 (Marine Corps Ground Mishap Reporting), or OPNAVINST 5102.1 (Mishap Investigation and Reporting); and the Unit SOP.

4-5. **HEAT Performance phase learning objectives, and rollover (sequence)** drill task steps and performance measures. Two HEAT instructors will be present at all times the device is in use. The front instructor (device operator) shall control the electric motor for roll operations. Both operators will do a complete walk-around of the device prior to each roll to verify door closure and positive locking of the gunner hatch lock mechanism – and security of each crewmember in their seats, with their seat belts securely fastened. Prior to device operation, both instructors will position themselves on opposite ends of the device, diagonally across from each other to allow a clear and unobstructed view of both sides of the device to ensure doors remain closed throughout the roll cycle.

a. The Vehicle Commander (VC) position will always be manned if there is more than one person in the device. The VC is responsible for ensuring all personnel within the HEAT are buckled in, the gunner is properly restrained, and the combat locks are engaged on all doors.

b. The device operator will call, "*Pin is out – device is unlocked, clear front.*" The instructor positioned at the rear of the device will respond, "*Doors locked – clear in the back.*"

c. Once all positions report ready to the VC, the VC will give a thumbs-up sign to the Primary HEAT Instructor (switch operator); who will give a **single blast on the whistle or horn to signal rotation**. Only then is the device ready for operation.

d. Procedures for the use of the HEAT will be per appendix F. When the crewmembers are ready, the device operator will rotate the simulator. Crewmembers will lower their chins to their chests, pull their arms across their chests, and brace their legs against the floor without locking their knees. Once the rolling has stopped, and the device is in the desired position to complete the crew/battle drill, the Primary Instructor will give **three blasts** on the whistle/horn as the signal to **egress**. Crewmembers will remain in the belted position until the device comes to a complete stop, and the Primary Instructor sounds the three blasts. Crewmembers will wait three to five seconds to orient themselves, brace against the ceiling with one hand then release the lap belt with their other hand. Next, they will pull down free of the seat and rotate to a horizontal face down position while holding on to a reference point with both hands. The crew will then proceed with a normal egress.

e. Execute rollover drill (Water egress considerations and additional steps are indicated in red):

Note: All personnel in a seat with restraints will wear them.

(1) **Driver.**

(a) Releases the accelerator.

(b) Yells, "*Rollover!*" When water entry is imminent, yells, "*Water!*"

(c) Keeps hands on the steering wheel, tucks head and chin into chest and braces for impact.

(d) Steers vehicle to control entry into the water to prevent rollover.

Note: Although TC 21-305, para. 3-2b Note prescribes the yelling of "*Rollover!*", each crewmember should repeat the "*Rollover!*" call as many times as it takes to garner the attention of any drowsy or inattentive crewmembers.

(2) **Vehicle Commander (VC).**

- (a) Yells, "Rollover!" When water entry is imminent, yells, "Water!"
- (b) Pulls gunner into cab.
- (c) Tucks head and chin into chest and braces for impact.
- (d) Plants feet firmly on the floor without locking the knees, while holding onto a stationary object.

(3) **Gunner.**

- (a) Yells, "Rollover!" When water entry is imminent, yells, "Water!"
- (b) Pushes/pulls self down into the vehicle.
- (c) Tucks head and chin into chest and holding onto a stationary object, brace for impact.

(4) **Crew.**

- (a) Yells, "Rollover!" When water entry is imminent, yells, "Water!"
- (b) Pulls gunner into cab.
- (c) Tucks head and chin into chest and braces for impact.
- (d) Plants feet firmly on the floor without locking the knees, while holding onto a stationary object.

4-6. **HEAT performance phase learning objectives. Egress (sequence) drill task steps and performance measures.** Execute egress drill. After the rollover has stopped (Water egress considerations and additional steps are indicated in red):

a. **Driver:**

- (1) Disconnects headset.
- (2) Releases seatbelt; uses caution if upside down.
- (3) Assesses injuries.
- (4) Unlocks combat door locks.
- (5) Exits the vehicle with weapon.
- (6) Assists crew to exit.
- (7) Checks for fire.
- (8) Provides security.
- (9) Provides first aid.
- (10) Recovers sensitive items.
- (11) Assists in vehicle recovery.
- (3) Exits the vehicle.
- (4) Assesses injuries.
- (5) Assists crew to exit and secures weapon.
- (6) Decides whether to remove load-bearing equipment (LBE), body armor, and helmet.
- (7) Gets to safest shore.
- (8) Provides security.
- (9) Accounts for crewmembers.
- (10) Provides first aid.
- (11) Recovers sensitive items.
- (12) Assists in vehicle recovery.

b. **VC:**

- (1) Disconnects headset.
- (2) Releases seatbelt; uses caution if upside down.
- (3) Assesses injuries.
- (4) Unlocks combat door locks.
- (5) Exits the vehicle with weapon.
- (6) Assists crew to exit.
- (7) Establishes security.
- (8) Accounts for sensitive items.
- (9) Reports accident.
- (10) Provides first aid.
- (11) Assists in vehicle recovery.
- (3) Exits vehicle.
- (4) Assesses injuries.
- (5) Assists crew to exit and secures weapons.
- (6) Decides whether to remove LBE, body armor, and helmet.
- (7) Gets to safest shore.
- (8) Establishes security items.
- (9) Accounts for crewmembers.
- (10) Accounts for sensitive items.
- (11) Reports accident.
- (12) Provides first aid.
- (13) Assists in vehicle recovery.

c. **Gunner:**

- (1) Disconnects headset.
- (2) Assesses injuries.
- (3) Clears and checks weapon for serviceability.
- (4) Exits vehicle with weapon.
- (5) Assists crew to exit.
- (2) Releases seatbelt; uses caution if inverted.
- (3) Exits the vehicle.
- (4) Assesses injuries.
- (5) Clears and checks weapon for serviceability.

- (6) Establishes security.
- (7) Recovers sensitive items.
- (8) Provides first aid.
- (9) Assists in vehicle recovery.
- (6) Decides whether to remove LBE, body armor, and helmet.
- (7) Gets to safest shore.
- (8) Provides security.
- (9) Recovers sensitive items.
- (10) Provides first aid.
- (11) Assists in vehicle recovery.

d. Crew:

- (1) Disconnects headset(s).
- (2) Releases seatbelt; uses caution if inverted.
- (3) Assesses injuries.
- (4) Unlocks combat door locks.
- (5) Exits the vehicle with weapon.
- (6) Assists crew to exit.
- (7) Provides security.
- (8) Provides first aid.
- (9) Recovers sensitive items.
- (10) Assists in vehicle recovery.
- (3) Exits the vehicle.
- (4) Assess injuries.
- (5) Assists crew to exit and secure weapons.
- (6) Decides whether to remove LBE, body armor, and helmet.
- (7) Gets to safest shore.
- (8) Provides security.
- (9) Accounts for crewmembers.
- (10) Provides first aid.
- (11) Recovers weapons, ammunition, and sensitive items.
- (12) Assists in vehicle recovery.

e. Water Rescue and Recovery.

- (1) Secure the accident site.
- (2) Stay in contact with the vehicle, hold onto the vehicle and kick/swim to a high point in buddy teams.
- (3) Rescuers tie a rope, tow strap or cable to the vehicle to aid in rescue.
- (4) Open doors and hatches.
- (5) If doors and hatches are not accessible, rescuers must immediately use all available means to turn the vehicle on its side to gain access to the turret – being mindful of the possibility of rolling the vehicle into even deeper water, or further into a current.
- (6) Seek out the highest point on/in the vehicle.
- (7) Ensure all survivors have air and are able to breathe.
- (8) Check for other injuries and apply first aid.
- (9) Carefully move injured personnel to the highest point on the vehicle.
- (10) Remove excess equipment, to include body armor, in deep water.
- (11) Evacuate from vehicle high point to safest location, depending on:
 - (a) Enemy situation;
 - (b) water level and flow;
 - (c) water temperature (hypothermia consideration);
 - (d) distance to waters edge; and
 - (e) anticipation of rescue.

(Appendix A and subsequent text continued on next page.)