

# Accident Reviews

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- AMV Accident
- Environmental Injuries
- Field Training Accident
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- Weapons-Handling Accident

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# M113 Accident Review

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Despite the fact that the Army is in the process of changing over from the M113 to the M2 armored personnel carrier, the M113 remains the workhorse of most mechanized infantry units. It also remains the source of many accidents and injuries. Following are some suggestions on ways to prevent them. Much of the information applies to both the M113 and the M2.

## Hatches

The problem of hatches slamming shut and injuring crewmembers was addressed by the Army Materiel Command in 1975. A safety pin modification was made to prevent hatch latches from releasing. After 1978, the safety pin modification was made on all new and rebuilt M113s. However, broken, worn, or inoperative latches and missing, unused, or improperly used safety pins still result in hatch injuries. Commanders need to—

- Ensure that the safety pin modification is on all M113s.
- Enforce the use of the safety pin.
- Require regular maintenance of the hatch and safety pin. A bent safety pin will not fit; it must be both available and serviceable.

## Ground guides

Ground guides are responsible for seeing that tracked vehicles do not injure anyone and that the vehicles do not sustain or cause damage while maneuvering.

A 16 March 1984 message clearly stated FORSCOM's tracked vehicle groundguiding policy:

- Before a tracked vehicle is started in an assembly area, a member of the crew must walk completely around the vehicle to ensure nobody is in danger from the vehicle's movement.

- During movement within or through an assembly area, tracked vehicles require ground guides front and rear. Guides must be able to see each other and one must be visible to the driver at all times.

- Failure to follow these rules provides a basis for disciplinary action under the UCMJ.

In addition, FM 21-306: Track Combat Vehicle Driver says to always use a ground guide when traveling cross-country during periods of reduced visibility if the tactical or training situation permits.

## Slave starting

Not knowing or not following safe M113 slave-starting procedures has resulted in soldier deaths and injuries. Two major warnings should be remembered and followed:

- Do not allow anyone between vehicles.

- The slave cable is "hot" and may cause an arc while disconnecting. Be careful to pull the connectors away squarely.

The following procedures are for slave-starting all M113-series vehicles except the M577A1/A2.

- Position the live vehicle beside the dead vehicle (never nose to nose). Lock the brakes, shut off the engine, and turn off the master switches **in both vehicles**.

- Unscrew the caps from the auxiliary power receptacles and connect the slave cable to both vehicles. Make sure the cable prongs match the receptacle holes, + to + and - to -.

- On the live vehicle, turn on the master switch, start the engine, and bring it up to fast idle (1000 rpm) to show charging on the vehicle battery-generator indicator gauge.

- On the dead vehicle, make sure all communication equipment switches are in the off position, push in the fuel cutoff control, start the engine, bring it up to idle, and then turn on the master switch. (NOTE: In cold regions, activate the air box heater switch at the same time as the starter button.)

- Disconnect the slave cable from both vehicles.

## General safety procedures

- All personnel must wear their steel helmet or CVC helmet when mounted and the M113 is operating.

- All personnel must wear earplugs while riding in an APC.

- Personnel should enter APCs through the rear door/ramp after signaling the driver that they are going to enter or after the vehicle commander has ordered them to mount.

- Before raising or lowering the ramp, the vehicle commander or a ground guide must visually check the area around the ramp and tell the driver when it is clear. Vehicles with inoperative ramps should be deadlined and ramps marked on the outside with "Warning—free falling ramp."

- Passengers should stay in their seats and use the safety belts while the APC is in operation. All personnel must have feet planted and a firm handhold.

- All equipment should be securely tied down inside the vehicle to prevent its being thrown around when the APC travels over rough terrain.

- A three-point contact is absolutely necessary when mounting or dismounting an APC.

- Keep a low profile when observing from the hatches; only head and shoulders should

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protrude (nametag defilade).

- At least one hatch should be open at all times when operating the APC heater.

- Keep all radio antennas tied down when operating near powerlines. Electricity can arc through the antenna tip to the APC and cause fuel and ammunition to explode.

- Dust distance must be maintained when traveling in convoy or in column.

- When refueling an APC—
  - One soldier will man a portable fire extinguisher in the vicinity of the filler cap.

- Smoking within 50 feet of the APC is prohibited.

- Engine should be shut off and the master switch should be in the off position.

- When refueling from a fuel truck, personnel should make sure that the bonding cable is connected between the vehicles.

- A message from Commander, TACOM, AMCPM-M113.101530Z Mar 86, subject: M113 FÖV Swim Operations, halted all M113 water operations training.

# AMV Accident Review

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AMV operations are fundamental to all infantry units; troops must be moved, supplies hauled, maintenance done. But AMV operations are also a leading source of accidents—accidents that are expensive in both money and manpower. Time spent on paperwork, in recovery and down time of equipment, and lost productive work hours due to injuries all reduce combat readiness. Let's look at the activities that most often result in AMV accidents in infantry units.

## Convoy operations

Convoy accidents occur most frequently during the day to drivers who have been on duty 4, 6, or 8 hours. These accidents most often involve rear-end collisions. They usually are the result of following too closely, environmental conditions, materiel failure, blackout conditions, or fatigue.

**Following too closely.** How close is too close? It varies with the conditions. Safe following distance must be determined by considering convoy speed, road condition, visibility, vehicle condition, and reaction time. Under **any** adverse condition, following distance should be increased.

**Environmental conditions.** Rain, fog, ice, snow, and dust require increased stopping distance. Drivers must increase following distance and slow down.

**Speed.** Convoy speed depends on road and traffic conditions and on the slowest convoy vehicle's speed. On long moves over rough roads, convoy speed should not exceed 15 to 20 mph with prescribed maximum catch-up speed of 25 to 30 mph.

**Materiel failure.** Drivers are the key to preventing materiel failure accidents through proper preventive maintenance of vehicles. Officers and NCOs are responsible for assuring proper performance of PMCS.

**Blackout conditions.** To reduce

risk in blackout driving, be sure all blackout marker lights are working properly and use lower speeds. Someone in the rear of a vehicle with a screened flashlight can warn a driver who follows too closely.

**Fatigue.** Long hours on duty (not just driving time) and heat add to driver fatigue. According to AR 55-29, convoy vehicle drivers will be given an opportunity for 8 hours of rest for each 10 hours of driving within a 24-hour period. Rest periods will begin 12 hours before convoy departure.

## Hauling/transporting

FM 21-305 places the responsibility for ensuring that the load is secure on the driver. He is to see that all passengers are on board and that restraint systems are secured before moving the vehicle. It is also the responsibility of the senior occupant of the vehicle to ensure that the vehicle is operated in accordance with regulations.

## Ground guides

The purpose of using ground guides is to move a vehicle safely. Drivers are responsible for using ground guides and for ensuring they can maneuver their vehicles safely. Drivers should—

- Never move vehicles without first checking on both sides, front, and rear to ensure they can maneuver without endangering personnel or equipment (FM 55-30).
- Use ground guides in bivouac, assembly, and maintenance areas and when moving through dismounted troops.
- Use ground guides before and during any backing operations.
- Use a ground guide when traveling cross-country during periods of reduced visibility.
- Keep ground guides in sight and about 10 yards between ground guides and the vehicle.
- Stop immediately if they lose sight of the ground guide.

## Maintenance

To keep AMVs operating, it is vital that maintenance personnel and operators follow correct, safe maintenance procedures.

**PMCS.** Preventive maintenance checks and services are done to identify operational deficiencies that might adversely affect the mission capability of the equipment. These are done daily and in accordance with the equipment operator's manual.

**Brakes.** To maintain brake safety in the older fleet of trucks, increased attention to high-quality maintenance is a first priority. Meticulous maintenance must be performed at all levels, with special emphasis on drivers' preventive maintenance checks and services.

Minimum vehicle safety standards are listed in AR 385-55: Prevention of Motor Vehicle Accidents. TMs state that equipment is not ready or available if "service brakes do not operate properly." The following actions can help reduce brake failures:

- Ensure preoperational checks, with special emphasis on brake systems, are performed by drivers before they accept any vehicle. Hold drivers responsible for making these checks.
- Have first-line supervisors enforce and supervise drivers' preoperational checks.
- Require drivers to check master cylinder and inside areas of all four wheels to be sure there are no fluid leaks.
- Ensure vehicles with defective brakes are towed when moved for maintenance.
- Have maintenance personnel **red tag** vehicles with defective brakes.

**Jump starting.** From time to time, jump starting a vehicle is necessary. It is a safe operation if done correctly. Be sure soldiers know the correct steps. A decal (available from the Army Safety Center) inside the hood of AMVs keeps the correct procedure readily available.

# Environmental Injuries Review

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The “train as you will fight” concept dictates that we conduct all types of training under all types of environmental conditions. Tactical field training under severe environmental conditions will result in significant losses of both soldiers and equipment unless units are properly prepared and the training is properly planned. Prevention of environmental injuries is a command responsibility.

While it is unrealistic to expect to prevent every environmental injury, commanders must take steps to minimize the number and severity of such injuries. Just as we would not create conditions that needlessly reduce our capability to perform in combat, we must not do so in training.

The two conditions that present the greatest hazards are cold weather and hot weather. While these two conditions appear to be opposite, many problems, and therefore the solutions, are similar. Operations during both cold and hot weather require that soldiers be educated about prevention of environmental injuries, properly conditioned and acclimatized, properly equipped, and required to maintain their equipment. The actions required to accomplish these things start with long-range

planning and continue until the training exercise is completed.

Most units have an annual training plan that outlines training periods, mission support periods, and installation support. In addition, standdowns, large FTXs, and ARTEPs are highlighted. This information enables commanders to determine what operations are to be conducted where and when. They can then identify operations that will make their units susceptible to heat or cold injuries. Policies and procedures for those operations should be reviewed to ensure that the hazards are adequately addressed. Commanders can couple this review with an evaluation of soldier skills and acclimatization and the unit’s equipment and maintenance posture to identify actions required to reduce the risk of environmental injury.

Commanders should review operations plans to ensure that provisions are made for known hazards and that contingency plans are included for rapid changes in weather.

These actions will also increase the ability of staff personnel and subordinate leaders to evaluate operations, anticipate potential problems, prepare adequate contingency plans, execute contingency plans at the appropriate time, and, at battalion and brigade level, improve staff interaction. The time spent developing these skills pays big dividends not only in preventing environmental injuries, but also in the ability of the unit to operate in rapidly changing combat situations.

Specific actions for preventing heat or cold injuries include the following:

- Conduct briefings on events that could increase hazards (i.e., water-crossing operations during cold weather).
- Conduct refresher training on symptoms of heat or cold injuries.
- Use the buddy system during periods of high hazard to identify potential victims.
- Conduct refresher training on use of special equipment (e.g., field stoves).

# Field Training Accident Review

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Few factors have a greater adverse effect on mission accomplishment than loss of personnel. During field training, Army units, including infantry units, are losing personnel to a variety of accidents. Some of the most common ones are as follows:

## Slips and falls

Accidents involving slips and falls may seem "ho-hum," but the losses aren't. During two recent fiscal years, slips and falls during tactical training resulted in one death, 548 injuries, 11,358 lost workdays, and \$2.9 million in accident costs.

Excessive haste, especially in bad weather or during times of limited visibility, is the main cause of slips and falls. As a leader, you must take the time to ensure personnel know how to identify common hazards and how to cope with them.

- Caution soldiers to pay attention to their surroundings, watch where they are going, and be aware of terrain conditions.
- Enforce the three-point-contact rule (two hands and one foot) at all times when mounting and dismounting vehicles.
- Ensure mounting/dismounting and walking surfaces on vehicles are clean and free of mud, ice, snow, grease, and debris.

## Rappelling

Air assault and light infantry operations require rappelling skill. To acquire it, soldiers rappel from aircraft, buildings, cliffs, and towers. Some of them get hurt in the process.

Late, lost, or improper braking causes half the rappelling accidents. Rappellers' braking errors result when soldiers gain too much speed and turn loose of the rope, when they try to complete a rappel using only one stop close to the ground, and when they forget that the standard rappelling rope will stretch up to 33 percent.

Proper use of and performance by belay personnel could greatly reduce rappelling accidents. FM 31-72: Pathfinder Handbook gives detailed guidelines for the belay man.

## Water training

Water training is an important but hazardous part of field training. The three errors most often responsible for water training accident fatalities are failure to follow procedures, failure to check water depth and current, and soldiers' overconfidence in their own or their team's abilities.

To prevent such accidents, commanders and supervisors must—

- Ensure written procedures are followed.
- Take adverse administrative action against those who fail to comply with procedures.
- Know their own abilities and those of their soldiers.
- Perform their mission without taking unnecessary risks during training.
- Ensure adequate reconnaissance is completed immediately before water training operations.

- Ensure all personnel involved in water training are informed of water depth and current conditions before participating in river crossings or survival, escape, resistance, and evasion (SERE) training.

## Sleeping in the field

The mission dictates to a great extent when, where, and how long soldiers sleep during field training exercises. However, seeing that soldiers sleep safely is a command responsibility. Commanders can do this by—

- Designating an area that presents the least hazards commensurate with the mission.
  - Ensuring that unit leaders **check** to see that command guidance is followed.
- Unit leaders should consider the following before allowing the troops to sleep:
- Perimeters should be established and guards trained to challenge vehicles and tell them it is a dismount area.
  - Walking guards should be posted.
  - Ground guides must be used when a vehicle moves through any area where sleeping troops may be present.
  - Soldiers should never be allowed to sleep adjacent to a roadway.
  - Soldiers should never be allowed to sleep in front of, behind, or under vehicles.

The designation of where to sleep is a commander's prerogative. That prerogative carries with it the responsibility for the safety and welfare of soldiers.

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### Returning to garrison

Properly preparing for the return to garrison after a field exercise is one of the greatest safety challenges faced by commanders. Soldiers are usually tired, their thoughts turn from tactics and maintenance to hot baths and dates or family. In short, they are ready to ***get home***. This is when even the best soldiers are prone to push too hard, use shortcuts, and take chances. A safe return from the field doesn't just happen; it is

planned and supervised. The plan should accomplish, at a minimum, the following:

- Sufficient time to check vehicles and properly load equipment.
- Procedures to either fix or tow vehicles with maintenance problems, especially brake

problems.

- Use of a rested driver and assistant driver or senior occupant.
- Prohibit the possession or use of alcohol in the field.
- If a unit party is planned in the field, a suitable rest period must be planned and enforced following the party.
- If a unit party is planned upon return to the unit area, a plan must be established to ensure soldiers living in family housing or off post get to their quarters safely.

# Tactical Parachuting Accident Review

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Tactical parachuting accidents exact a heavy cost in injuries, lost time, and money. Most of these accidents occur when a parachutist makes a poor parachute landing fall (PLF). Other accidents have been attributed to lack of leadership and to water landings.

## Poor PLFs

Most poor PLFs result from jumpers' preoccupation with other conditions, such as poor visibility, winds, other jumpers, riser twists, or terrain obstacles.

**Poor visibility.** Poor visibility makes it hard to judge how close you are to the ground. To lessen the dangers from this condition, jumpers must—

- Know the illumination forecast before the jump.
- Lower load-bearing equipment early.
- Keep feet together; never feel for the ground.

**Wind.** Wind gusts just before landing are real injury producers. To prevent being surprised by wind gusts, jumpers must—

- Know the wind conditions before they jump.
- Listen for surface winds during prejump briefings and while on board the aircraft.

• Activate one of the canopy-release assemblies immediately after completing the PLF.

**Other jumpers.** Some jumpers become so engrossed in watching for other jumpers they forget to lower their equipment and prepare to land. To avoid other jumpers and make a safe PLF, jumpers should—

- Execute performance point three, FM 57-220 (keep a sharp lookout during descent).

• Control the situation (perform body turns or slips).

• Prepare to execute performance points four and five (prepare to land; land).

**Riser twists.** Most riser twists occur because the jumper had a loose body position on exiting the aircraft. So, to prevent riser twists, jumpers should—

- Perform a vigorous door exit.
- Maintain a tight body position.

## Terrain or ground obstacle.

Features of a drop zone can change from day to day from the effects of nature or the effects of humans. To minimize this danger—

- Jumpmasters should brief jumpers on drop zone conditions as if they are heading for an unfamiliar drop zone each time they jump.
- Drop zone safety officers should mark obstacles.

## Water landings

FM 57-220 gives detailed procedures for conducting planned water operations. These procedures define stringent conditions for water, weather, personnel, and equipment. However, procedures to be used when inadvertently entering water are not so clearly defined. Troopers should know and follow these procedures for inadvertent water landings:

- Jettison equipment and helmet.
- Pull waistband quick-release and disconnect the left snap connector of reserve.

• Pull the saddle up until you are sitting in the harness.

• Disconnect both leg and chest quick-ejector snaps.

• Keep elbows against sides to hold yourself in the harness.

• As soon as your feet hit the water, **but not before**, arch your body, throw your arms straight up, and slip out of the harness.

• If you have any trouble slipping out of the harness in deep water, activate the canopy-release assembly to get rid of the main chute; swim upstream or into the wind; and get as far away from the main canopy as possible.

• If you're wearing a **B7** life preserver (the one that fits under the armpits), pop the gas valves while still in the air and then activate both canopy-release assemblies after you hit the water.

• If you're wearing a **B5** life preserver (the one that fits under the harness), **do not** activate it while in the air or **still in the harness** because it will crush your ribs.

## Lack of leadership

A basic tenet of military leadership is that leaders must know, understand, and look out for the welfare of their soldiers. Looking out for soldiers' welfare means more than giving them time off. It requires leaders to—

- Ensure soldiers are trained and proficient in their jobs.
- Ensure soldiers are properly equipped to do their jobs.
- Know the qualifications of their troops.
- Check that first-line supervisors are fulfilling their leadership responsibilities.

# Physical Training Accident Review

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Physical training is necessary to keep soldiers fit for fighting. Obstacle courses and sports activities are intended to improve soldier fitness, but they often result in soldier injuries.

## Obstacle courses

During fiscal years 84 and 85, obstacle course accidents injured 269 soldiers at a cost of \$1.5 million. Most of these accidents were caused by one of four factors:

- **Fatigue or lack of strength.** Rope climb and swing obstacle accidents occur when soldiers are not strong enough to negotiate the course or become tired due to the length of the course. The more difficult obstacles should not be placed close to the end of the course since fatigue will magnify the effects of lack of strength. Physical training programs to develop upper body strength before soldiers attempt the obstacle course and placing the more difficult obstacles first will reduce accidents of this type.

- **Environmental conditions.** Obstacle course accident potential increases when obstacles are wet or covered with frost or ice. Logs, timbers, and ropes become smooth through use, and when they are wet or covered with frost, there is not enough traction to keep soldiers' hands and feet from slipping. When such conditions exist, commanders should reschedule the training.

- **Design and maintenance of course.** Deteriorated or loose logs and timbers can shift or break, causing soldiers to fall or be off balance when they jump. Also, some courses don't have sawdust pits installed to cushion falls, or the pits are allowed to compact and become hard. Leaders should walk the course and know its condition before they send their troops through it.

- **Supervision.** In most obstacle course accidents, supervision contributed in some way. Leaders failed to recognize or correct hazards. Commanders and supervisors should review FM 21-20: Physical Fitness Training, August 1985, and evaluate their program and obstacle course facilities.

## Sports

Army leaders have long recognized the value of sports in developing physical and mental fitness, confidence, aggressiveness, and determination. Team and intramural sports develop teamwork and unit esprit. However, the positive potential of a sports program can be quickly offset by injuries if the program is

not properly organized and supervised.

During FY 85, units Armywide reported 1,611 sports injuries that resulted in 35 fatalities, 4,865 days of hospitalization, 16,184 lost workdays, 29,769 restricted workdays, and a cost of \$7.8 million. The 195 man-years of lost productivity and training time is equivalent to losing a light infantry battalion for 2.8 months or a mechanized infantry battalion for 2.6 months. The \$7.8 million is roughly equivalent to the cost of six M2 Bradley Fighting Vehicles.

These losses were the result of both unit-sponsored and off-duty sports. While off-duty sports cannot be fully controlled, the quality of the unit sports program directly influences the number of off-duty accidents involving unit personnel. The habits, good or bad, developed in the unit's sports program will carry over to off-duty sports. A good unit sports program requires the following:

- Proper facilities and equipment.
- Education of unit personnel on rules, hazards, and required conditioning.
- Proper physical conditioning for the sport.
- Sufficient supervisors (referees, coaches) who are properly trained.
- Command emphasis on compliance with the rules and good sportsmanship.

# Weapons-Handling Accident Review

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Weapons-handling accidents occur frequently in infantry units. Injuries occur when soldiers are hit by live rounds, by packing or wadding when a blank adapter is not used, or by shrapnel and rock fragments from rounds hitting nearby. Injuries also occur when soldiers are cleaning weapons, firing without hearing protection, or while firing left-handed without a brass deflector. These injuries are caused by failure to properly clear the weapon, failure to exercise proper safety precautions when firing blanks, and lack of supervision. Following are examples of and corrective actions for each.

## **Failure to properly clear the weapon**

When he went on guard duty, the soldier picked up a rifle without a magazine in it. He assumed it was unloaded. As he approached his guard post, he pulled the weapon upward and placed the forward stock in his left hand. The weapon fired, hitting the guard on duty in the back and killing him. Someone had chambered a round in the weapon and failed to clear it.

- When a soldier takes control of a weapon, he should immediately check to ensure it is clear.
- Units should have a designated area for clearing weapons before turn-in, especially after live-fire exercises or duties requiring drawing of ammunition.

## **Failure to follow safety procedures when using blank ammo**

The soldier's platoon was lying in the prone position awaiting the star cluster signal for attack. An unidentified member of the opposing forces apparently spotted a shadow. He stuck an M16 rifle, loaded with blank ammo and without a blank adapter, about an inch from the soldier's face and pulled the trigger. Powder and packing struck the soldier in the eye. The unidentified soldier failed to follow correct procedures for using blank ammunition.

- Blank adapters should be used at all times when firing blanks.
- Soldiers should not fire blanks at personnel at close range. They should be educated to the dangers of doing so.

## **Lack of supervision**

A sergeant and a specialist were reconning an area during the company defense. They were spotted by an opposing force first sergeant who sent two other sergeants after them. One of the pursuing sergeants fired a burst of blank rounds. The other pulled back the charging handle and fired two rounds before he realized he was using live ammo. Shrapnel and rock fragments entered the specialist's leg when the rounds struck the ground near him. The range was under a cease-fire. Not only were weapons fired during a cease-fire, but rounds were fired out of the established range fan.

- Commanders must review the safety portion of SOPs to ensure weapons handling is adequately addressed.
- Commanders and supervisors should ensure all personnel are trained in safe weapons-handling procedures.
- Commanders must make sure blank adapters are available and used.
- Leaders should maintain positive control of ammunition to prevent mixing of live and blank ammo and to prevent unauthorized removal of ammunition from ranges.
- Commanders must ensure compliance with weapons-handling procedures.