

Forrester Assumes Command of USACRC

Army safety continued its transformation on 25 August 2006 as Director of Army Safety duties and command of the U.S. Army Combat Readiness Center (USACRC) changed hands during a ceremony at the U.S. Army Aviation Museum in Fort Rucker, AL. BG William H. Forrester assumed the roles and responsibilities from BG Joseph A. Smith, who held the positions for a little more than 3 years.

The USACRC is responsible for improving combat readiness and preserving combat power. As a field operating agency of the Office of the Army Chief of Staff, the USACRC is the knowledge center for all Army losses and the focal point for analyzing accident, serious incident, and combat loss reports.

After congratulating BG Smith for his contributions to Army safety and awareness, BG Forrester said to the warriors of the USACRC that together they will continue the positive trends they've blazed, "always looking to raise the bar."

A 20-percent reduction in accidental losses overall is one positive trend USACRC and Army members are witnessing this fiscal year.

"Joe Smith has done something no one before him has ever been able to do. He has turned the tide," said LTG James L. Campbell, Director of the Army Staff. "He has turned that mammoth battleship in saving Soldiers' lives. As a result of his passion and sheer determination, our United States Army reduced our accidental losses by 20 percent from last year to this year. That is Soldiers' lives ... and the stakes don't get any higher."

Officials at the USACRC attribute the majority of the decline to leader



involvement and the implementation of several new initiatives, including the Army Safety Management Information System-2, or ASMIS-2, POV risk assessment tool.

This risk-planning tool allows travelers to create a tailor-made risk analysis and receive specific guidance to lower risks on road trips. Since its inception, statistics show that Soldiers have completed more than 1.3 million assessments. Of those people who completed the assessments, only four have been killed while operating a vehicle.

"It is obvious there was much work accomplished and all focused on preserving our Soldiers, civilians, and equipment," BG Forrester said about the USACRC warriors.

BG Forrester comes to the USACRC after serving as the assistant division commander (support) for the 2nd Infantry Division, Eighth U.S. Army, Korea. Though he was previously assigned at Fort Rucker as the U.S. Army Aviation Warfighting Center and post chief of staff, BG Forrester said this assignment has a broader focus over the full spectrum of the Army.

"As is the case in this great Army of ours, as one superb leader steps down, another superb leader steps forward to take the reigns and take the organization to even a higher level," LTG Campbell said. "Forrester joins the (USACRC) with

a rich background in operational experiences. He has commanded an aviation brigade in combat ... and his experiences here at Fort Rucker as the chief of staff of the U.S. Army Aviation Warfighting Center, where the importance of preserving combat readiness is there every single day, will make him even more effective as a leader of the USACRC."

Drawing from his experiences, BG Forrester revealed his outlook on the way ahead for the USACRC.

"My wife and I are humbled by the continued opportunity to serve our Army," he said, "and we fully realize that our assignment at the Combat Readiness Center is just that. We look forward to forging strong professional and personal relations with organizations across the Army and the Department of Defense."

Directly following the change of command, the USACRC conducted a retirement ceremony for BG Smith, who completed more than 32 years of service. He said serving in this position was very rewarding.

"When I think about each Soldier that has died, I am convinced that we have saved not some lives, but many lives. That's what it's all about."

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Why and How We Do It

ACCIDENT INVESTIGATION DIVISION

Ground Branch

U.S. Army Combat Readiness Center

The accident investigators assigned to the U.S. Army Combat Readiness Center (USACRC) are often asked what we really do when we're deployed. We've written this article to explain the purpose and goals of our investigations so everyone can understand what we do and how we do it. Most Soldiers would agree their jobs are dangerous, but those tasks don't have to be unsafe. If a Soldier is seriously hurt or killed, it's our job to find out what went wrong so you can accomplish your missions safely.

Our primary objectives are to identify contributing factors and/or system deficiencies and make recommendations to remedy causes and minimize the chances of similar accidents occurring in the future. We simply want to know what happened, why it happened, and how it can be prevented from happening again to save lives, reduce damage to equipment, and maintain the fighting force. But before we discuss how the board actually works, here's some background information to help you understand the administrative side of our investigations.

Our manual is Army Regulation (AR) 385-40, *Accident Reporting and Records*, which mandates that all Class A and B accidents be reported to the USACRC. We have a first-up team that's deployed from the USACRC in Fort Rucker, AL, to conduct a centralized accident investigation (CAI) for selected Class A and Class B accidents. In some instances, the accident is investigated by a local installation accident investigation (IAI) board, but the investigators here provide advice and review all documentation before the IAI board's results, findings, and recommendations are finalized.

The USACRC's CAI teams include

a minimum of two people, the board president (rank of major or above) and board recorder (rank of sergeant first class or master sergeant). These Soldiers are the core of the accident board and have been schoolhouse-trained in accident investigation procedures. A point of contact is assigned as well, usually a trained safety officer delegated

have released the accident site or tell us no criminal intent was found, allowing us to begin our investigation. In the rare event we start an investigation and discover criminal intent, we stop and let CID take over, but we provide them with only the factual, non-privileged portions of our documentation.

We have priority over the collateral investigation for access



by the appointing authority. Additionally, subject matter experts (SMEs) including senior maintainers, training managers, and doctors or physician's assistants are drawn from other units to assist us when needed. Finally, depending on the mission, other service representatives might be assigned to the board on a case-by-case basis.

So where does the priority of our investigations fall in the grand scheme of things? There are three types of investigations that can occur for any given accident: a Criminal Investigative Division (CID) investigation; a safety accident investigation; and a collateral investigation. CID representatives usually are onsite before we arrive, and they'll either

to evidence, witnesses, and the accident scene. Even so, we must maintain a spirit of cooperation with the collateral board, which serves a very important function itself. In that spirit, we provide them with common-source, factual, non-privileged information as we review and record evidence.

With all that said, what do we do and how do we do it? First and foremost, our investigations are for accident prevention purposes only! Leaders and individual Soldiers must understand we gather the facts so we can keep the same accident from happening again. Our first-up teams are deployable within 2 hours of notification and placed on orders for the duration of the investigation, typically 14 to 21 days.

Contrary to popular belief, we don't collect witness statements. We question the Soldiers and witnesses involved and summarize each interview so the conversations legally become hearsay evidence. We want people to talk freely with us without fear of retribution from their chain of command, and this process protects our evidence and findings from being used in legal proceedings. Remember, our investigations aren't conducted for legal or punitive purposes, and the USACRC has an assigned legal officer who protects the confidentiality of our information.

Everyone involved in an accident investigation must be as honest and forthright as possible. We need to know everything, even if it's admitting a task was done the wrong way. It's possible other Soldiers are doing the same task wrong as well, and we must change how that task is being performed. USACRC investigators also assist in maintenance of and have access to an Army-wide accident database to determine trends and pinpoint recurring problems in different systems. Should your unit experience an accident or incident, report it. If we don't know about it, we can't fix it.

Each investigation's timeline has already been established before we arrive onsite and consists of several phases. Phase one is the organization and preliminary examination stage, where the board president has their inbrief, organizes the board, assigns duties and responsibilities, assumes site control, and performs an initial site assessment. This phase typically lasts 1 to 2 days.

Phase two of the investigative process, data collection, begins on day 3. During this time we look not only at the accident, but also the unit as a whole and the chain of command all the way

up to the Army Command. This process allows us to make accident prevention recommendations to the Department of the Army (DA) Staff. We handle witness summaries and also review the unit's maintenance and personnel records, personal protective equipment, and duty logs; check weather on the accident date; and perform any equipment teardown or operational checks. Data collection usually takes 3 to 8 days to complete.

Analysis and deliberations make up phase three, when we start putting all the pieces together. This process lasts 4 to 7 days. Phase four—completing the field report—occurs between days 12 and 18. The findings of this report are staffed upon completion through the USACRC SMEs as a quality assurance measure. When the investigators receive approval of their results, they outbrief the accident unit's chain of command. The outbrief consists of an informal pre-brief with the unit and their higher command (if time, location, and schedules permit) and then a formal outbrief with the unit's major command. The deployed investigators return to the USACRC when this phase is complete.

For a variety of reasons, Soldiers are often reluctant to talk about any accident their unit suffers, especially with us. Here are a few myths we've heard over the years:

- The investigators are out to get the accident crews.
- The investigators are out to get the accident chain of command.
- The investigators are here because the unit is messed up.
- The investigators are here to upset as many people as possible in the shortest amount of time.

These myths couldn't be further from the truth. We simply want to prevent another accident from happening, and

we have very strong feelings about it. Several different factors make people feel uncomfortable around us too, including:

- We're from the outside and not part of the accident unit.
- We don't know the people involved.
- We disrupt the unit's routine.
- We ask that a lot of information be made available to us in a short amount of time.
- We aren't there because you had a good day.
- We are a DA-level investigation.

What accident investigations ultimately come down to is this: We take our jobs and your life very seriously. There is no need to feel uncomfortable; after all, investigations are conducted for accident prevention purposes only. We simply want to make sure the same accident doesn't happen again to you or anyone else.

If you're called upon to conduct or assist with an accident investigation, feel free to give us a call at the number listed in this article's contact block or access the tools on our Web site, <https://crc.army.mil/>. (IAI board members should find the "Investigator's Handbook" very helpful; a new edition will be available online in October 2006). The USACRC investigators are here to help, not hinder. We really don't want to see you or your buddies, not because we don't like you, but because if we show up that means someone's been seriously hurt or killed. Play by the rules and use Composite Risk Management for all your missions, and maybe you'll never run into one of us. Nothing would make us happier! 

Comments regarding this article may be directed to the USACRC Accident Investigation Division Ground Branch at (334) 255-2932 or DSN 558-2932.

Hot Brass in the Summertime

ACCIDENT INVESTIGATION DIVISION
Ground Branch
U.S. Army Combat Readiness Center

"Put the weapon down and step away!" You usually only hear that phrase on television cop shows late at night, and if you hear it in real life, you're probably in big trouble. But these words don't apply only to criminal situations. Many a negligent discharge might've been prevented if someone had spoken up when they saw a comrade acting in an unexpected or less-than-safe manner. Such was the case in a recent negligent discharge accident.

After 30-odd pages of analysis, the local and centralized accident investigation boards came up with a recommendation for live fire ranges. When something unsafe or unexpected happens on the range, the person(s) involved should put the weapon down and step back before doing anything else. The chance for error and a negligent discharge is greatly reduced when the most dangerous object around is removed from human hands.

Before this particular accident, some Soldiers and Air Force members were training perimeter defense techniques. Two Airmen situated side by side fired their M16s over a wall at moving targets downrange. Hot brass from the left Airman's weapon landed on the other Airman's neck and rolled down his back. The burned Airman jerked his left hand up and pivoted his body to the left as he tried to brush away the scorching metal. However, his rifle was still in his right hand, and he didn't remove his finger from the trigger as he turned toward the other Airman. The M16 slipped off the table support, and its falling weight applied pressure to the burned Airman's trigger finger, causing the weapon to fire and hit the Airman to the left. He suffered extensive abdominal injuries but fortunately survived the incident.

Could this type accident happen on your range? The odds of this exact

incident happening again are phenomenally small, but there's always a chance when live ammunition is involved. Hot brass is a fact of life on live fire ranges, and it's also a common problem in close combat and military operations in urban terrain environments. But anything from a bee sting to a lightning strike or just a good scare could cause any Soldier to react in the same manner as the Airman in this accident, regardless their operational location.

Leaders and individual Soldiers applying Composite Risk Management (CRM) to their live fire training should automatically identify negligent discharges as a primary hazard on the range. But it's important not to discount the other events and circumstances that might result in an accident. A good resource for leaders preparing for a live fire exercise is the lessons learned from other units that have either recently completed similar training or conduct it on a regular basis. Identify what their problems were, assess your unit's risk, and mitigate accordingly.

The unit in this accident had the required officer in charge (OIC) and range safety officer (RSO) on the range that day, as well as additional safety officers who were acting as observers/controllers (O/Cs) during the exercise. Although not a contributing factor, it's possible the O/Cs could've missed an unsafe act because they were preoccupied with their controlling responsibilities. When training Soldiers or Airmen who aren't accustomed to live fire ranges, leaders must assess their safety officers' duties to ensure they aren't overtasked. For units that regularly train on these ranges, leaders should assess the need for safety mechanisms above



and beyond what's usually required.

Before they take over the range, OICs and RSOs are required to attend training with their local range control, and there are several vital questions that must be asked during this interaction. What are the steps for medical evacuation? What is the fastest and safest route to the nearest treatment facility? How will range control assist the unit with evacuation operations? These are important issues that must be discussed and planned for before the first shot is fired. When an accident or other injury occurs isn't the time to figure out the actual execution of a medical evacuation.

It's as simple as this: Put some thought into planning your next training event. CRM isn't just a paper drill for the operations order. Rather, it's a tool to help leaders identify how their Soldiers are at risk and how they plan to mitigate it. Visit the U.S. Army Combat Readiness Center's Web site at <https://crc.army.mil> to find out more about CRM and how you can Own the Edge both on and off the range. 

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They Finished the Job

ACCIDENT INVESTIGATION DIVISION
U.S. Army Combat Readiness Center

Only someone who's been there knows the relief when you finally hear a bird is on its way to pick you up from some remote, hostile locale. For one unit, this welcome news came after 3 weeks of hard fighting in the rugged mountains of central Afghanistan. A CH-47 Chinook was scheduled to extract the Soldiers from their remote observation points (OPs), but at night—a decision that both relieved and concerned the unit's NCO in charge (NCOIC).

The NCOIC was relieved his men were getting a well-deserved break, but he was concerned about using OP Alpha for a night extraction. The area was marked by several trees and littered with loose debris and trash from the unit's time there.

To make matters worse, the helicopter landing zone (HLZ) on OP Alpha was big enough for only the CH-47's back two wheels to touch the ground. The aircraft's nose would remain in the air over a steep cliff, and all these factors together made for one tough mission at night. Other CH-47s had landed at the HLZ before, but in the daylight; even then, there were a few tense situations because of the tight fit.

The NCOIC recognized the difficult circumstances and surveyed the area to see if anything could be done to help ensure a safe outcome. He directed a team to pack up and position the unit's equipment on the HLZ to facilitate rapid loading. The other NCOs supervised the collection and burning of the trash and debris. The NCOIC then tried to tackle the tree problem. He wasn't sure of the aircraft's exact clearance requirements, but he felt certain that if at least one of

the HLZ's two trees were cut down the pilots would have an easier time maneuvering the aircraft in the small area at night. He tasked a couple of his subordinates to cut down what he thought was the most problematic tree.

This job proved easier said than done. The tasked Soldiers couldn't find an axe, machete, or tree saw on the remote OP. They found a pick, hammer, and k-bar knife, though, and running short on time, they did



what most Soldiers would do—they worked with what they had with all the hooah they could muster. They began hacking at the foot-wide tree trunk with the knife at a feverish pace, but after several hours they were exhausted and had cut only halfway through the tree. The Soldiers were out of time and short on water, so they finished the other preparations and marked the HLZ.

They marked the obstacles with small chem lights, which they placed slightly above the ground for better visibility. The HLZ was narrow and there wasn't room for a full inverted Y, so the Soldiers secured two large chem lights on the ground near where the aircraft's rear tires were to touch down. Only minutes after the final checks where conducted, the inbound CH-47 crew called the pick-up zone control and announced they were 2 kilometers out from landing.

The aircraft made a couple of missed approaches before the

pilots successfully executed the difficult backing approach onto the small landing area. The 70-foot gap between the trees allowed only 4 to 5 feet of rotor clearance on both sides of the aircraft. But despite these challenges, the initial passenger and equipment loading went as planned.

About 45 seconds after landing, however, the first of the accident's chain of events happened. The aircrew saw some small, glowing spots directly below the aircraft's nose and apparently thought they were taking enemy fire. They made a hasty departure off the HLZ with only part of their passengers and cargo. The aircrew soon discovered the spots were merely burning embers from the trash pit just to their side; the aircraft's rotor wash had stoked the burn pit and caused the embers to fly through the air. Some

Soldiers covered the burn pit with dirt, and the CH-47 crew attempted another approach to pick up the rest of the passengers and cargo.

On this last approach, the CH-47's rear rotor disk contacted a tree on the left side of the HLZ. The aircrew attempted an emergency departure, but the rear rotor system collapsed 5 seconds after the tree strike. Tragically, the aircraft crashed on the nearby cliff and was consumed by a post-crash fire, killing all 10 Soldiers onboard.

A Marine platoon arrived at the HLZ soon after the accident to provide security. They saw the partially chopped tree and, realizing it would be in the way of the aircraft that would come get *them*, started taking the tree down with a tree saw. Within 10 minutes they'd finished the job the ill-equipped Soldiers had started earlier that day. They then walked down the cliff to assist in recovering the deceased Soldiers'

remains from the crashed aircraft.

By now you might be wondering why this accident account is appearing in *Countermeasure* and not *Flightfax*, the U.S. Army Combat Readiness Center's aviation risk management publication. The aircraft pilot in command is generally regarded as the final authority on HLZ suitability, but it's the whole team's responsibility, from private to commanding officer, to exercise Composite Risk Management (CRM) to minimize overall risk. We must apply the hard-learned lessons from this accident to future combat operations; after all, our ground troops rely on aircraft to get them in and out of places vehicles can't go.

HLZ preparation might seem like a small part of the big picture, but it plays a huge role in the CRM process for troops operating in remote areas. Just because an HLZ begins as an unimproved area doesn't mean it has to remain so. No Soldier tasked with HLZ preparation should be lulled into a false sense of security, even if an aircrew has managed to "squeeze in there" a time or two. No two pilots are alike, and no two missions are the same. What might be a fairly simple daytime landing for an experienced aircrew can be extremely challenging for a junior crew that's facing high winds, heavy sling loads, or low-illumination night operations. The goal of combat HLZ preparation is to maximize the chances of success in even the most challenging high-threat conditions, not simply do enough to get by and hope for the best.

There are a number of simple steps and resources Soldiers and leaders can use when preparing combat HLZs. Two good references are Field Manual (FM) 10-450-3, *Multi-service Helicopter Sling Load: Basic Operations and Equipment*, and the recently updated FM 3-21.38, *Pathfinders Operations*, both of which address the essentials of HLZ operations. The most basic

task is landing site selection, which is based on a number of tactical and safety factors including:

- Security and concealment: Landing sites should be shielded from the enemy as much as possible and offer good masking terrain on the approach and departure paths.

- Convenience: Landing sites should be situated in areas that limit the ground movement of cargo and troops as much as possible.

- Slope: Helicopters have a varied tolerance for landing on slopes, depending on the aircraft type and wind conditions. As a general rule, the less slope on the landing surface the better; but a 7-degree maximum slope on the landing surface is a good figure for planning. A global positioning system is a great tool for establishing the distance and gradient of slopes. Down-slope landings should be avoided because most aircraft have an extremely low tolerance for landing with the nose pointed down. Additionally, passengers and cargo should never be loaded from the upslope side because the steeper the slope, the closer the rotor system is to the ground.

- Surface suitability: Sod, hardstand, rock, or packed earth are the preferred landing surfaces for Army helicopters. Dusty surfaces should be avoided whenever possible.

- Obstacle clearance and size: The HLZ must have an obstacle-free approach path (i.e., clear of tall wires and unlit towers) and suitably large obstacle-free zones to accommodate the type and number of aircraft using the HLZ. FM 10-450-3 and FM 3-21.38 define the parameters for the three zones (red, green, and white) required at every HLZ. If more than one aircraft is scheduled to land in the HLZ, each helicopter must have its own obstacle-free zones.

- Marking and signaling: A number of marking and signaling

devices and techniques are available, but the most basic landing systems are the inverted Y for nighttime landings and the VS-17 landing T for daytime missions. The marking materials must be secured to withstand winds greater than 100 mph from the aircraft's rotor wash.

Ground troops and aviators have to work together to ensure the safety of all in the hectic and dangerous world of combat operations. Neither our ground nor air forces are fighting in ideal conditions, so cooperation between the two is vital to everyone's survival. The 10 good Soldiers we lost in this accident thought they were leaving the worst behind them, but it took only one broken tree and a few seconds for disaster to strike. Use CRM and take into account all the hazards your unit will face in combat, including those posed when the "freedom bird" lands. 

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A Map, but No Direction

Editor's note: The following article is based on an installation accident investigation (IAI). IAIs are forwarded to the U.S. Army Combat Readiness Center (USACRC) for finalization upon their completion at the Major Command level.

Two M1A2 Abrams tanks were tasked by their squadron commander to escort an explosive ordnance disposal (EOD) team to and from an enemy weapons cache site. The tanks were to provide security for the EOD team along the route of travel and during the demolition. The squadron tactical operations center briefed the tank crews, who'd been on patrol for another mission, via radio after they linked up with the EOD team on a main supply route (MSR). Although they identified the route, neither of the tank crews nor the EOD team was familiar with it or the area where the weapons cache was located. Their maps and imagery didn't provide them with enough information to adequately plan the mission either, so the teams' leaders decided to take an alternate route to look for other roads leading to the cache site.

It was around 1600 when the patrol finally departed the linkup point, with the two tanks leading

the EOD team's RG-31 Mine Protected Vehicle. The trip took significantly longer than planned because the route wasn't definitive, and the teams turned off several wrong roads before they found the cache site. They arrived there after dark around 1730, and the EOD team finished destroying the cache about 1845. The leaders then decided to return to the MSR using the same roads they'd traveled that afternoon, even though it was dark and they'd found the route through trial and error in the daylight.

The vehicle crews began the return trip in their earlier configuration and moved south on a sandy, clay road that paralleled the eastern side of a canal. The lead tank crossed a bridge over the canal and turned right into the northbound lane of a road along the canal's west side, and the trail vehicles followed soon thereafter. At this time the patrol was traveling about 5 mph under white lights with a 300- to 400-meter separation between the lead and trail tanks.

After making the right turn, the trail tank's rear began to shake violently as it moved across the base of a berm to the vehicle's left. The crew heard the track commander (TC) tell the driver to go left, and the driver accelerated the tank as he attempted to steer

left. However, the right edge of the road collapsed under the tank's weight as the driver tried to correct the vehicle. The crew heard the TC announce "rollover, rollover, rollover" as the tank overturned into the water-filled canal below.

The tank came to rest on top of its turret at the base of the canal and was submerged in waist-deep water. The TC was partially ejected outside the turret and trapped beneath the water. The gunner, loader, and driver briefly lost consciousness as the tank struck the canal's bottom and were unaware the vehicle was submerged until the gunner turned on an interior dome light and saw water inside the turret. On the TC's side, the water was knee deep; in the loader's area, it was several inches deep; and the turret was partially filled with water and sand.

The gunner and loader found the TC, but only his lower back, buttocks, and legs were visible inside the turret. They attempted to pull the TC wholly back into the turret but were unable to free him under the tank's weight. His legs were limp and floating in the water, but the rest of his body was rigid. The TC didn't respond verbally or move when the gunner and loader pushed an air hose through the TC's hatch, and the gunner couldn't



find the TC's pulse. The loader cut away part of the TC's protective vest and again tried to pull him inside the turret without success.

The driver couldn't open the driver's hatch and had to exit the vehicle through a small space between the gun breech inside the turret. Using an air hose to breathe, the loader and gunner egressed the tank through a crawlspace dug by the EOD team and lead tank's crew. The troop commander arrived several hours later at 0121 with three M88 Hercules recovery vehicles. It took about an hour for the recovery team to right the tank, and at daybreak they finally pulled it completely out of the canal and removed the TC's body. His death was attributed to blunt-force trauma suffered during the rollover and a lack of oxygen after the tank settled in the water.

The installation accident investigation conducted after this incident revealed two primary failures: a failure to adequately plan the mission and failure to execute proper rollover procedures. First, the two tank crews couldn't complete a map recon of the route to the demolition site because the

maps they had in their possession didn't provide sufficient detail for the crews to successfully navigate the area of operations. Leaders must ensure their mission fragmentary orders include detailed maps and sufficient route instructions so their crews can safely accomplish their missions.

The TC also didn't follow standard rollover procedures after the emergency was verbally acknowledged among the crew. Although he declared the rollover himself, the TC didn't continue the procedure for his position—namely, quickly dropping down inside the turret. His upper body was pinned between the turret edge and canal bottom as a result. This tragic loss illustrates the importance of rollover drills, which every Soldier must rehearse until the actions become instinctive. This feat can be accomplished by involved, caring leaders that emphasize the necessity of rollover training throughout their formations.

This accident was undoubtedly tragic, but there were a few simple steps the unit's leadership and the crews themselves could've taken to ensure mission success. We've

already discussed proper planning and rollover procedures, but we haven't talked about Composite Risk Management (CRM). Had the tank crews used CRM when they were trying to identify alternate routes, they might've realized the hazards they faced on the unimproved roads they ultimately selected. This instance wasn't the first time a canal road collapsed under a tactical vehicle in theater; similar roads have caved in under vehicles weighing far less than an M1 tank, including HMMWVs. The bottom line is every Soldier must take into account all the hazards, both tactical and accidental, that can hurt or kill them or their buddies. We need each one of you, so use CRM to stay ready and Own the Edge! 

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The Frosty Toe Mystery

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Warm, sunny weather is what most folks think about when it comes to the southern United States. It's not just warm, but downright hot here several months of the year. But the other extreme is also true—winters can be brutal, even if we don't have a lot of snow. Believe it or not, we've seen cold injuries here at the U.S. Army Ranger School in Fort Benning, GA, well below the Mason-Dixon Line.

Soldiers that fall victim to cold injuries usually end up much worse off because they and their leaders aren't trained to identify the early signs and symptoms of these afflictions. The Ranger School has an internal standing operating procedure in accordance with Army Regulation (AR) 350-1, *Army Training and Education*, and it's designed to mitigate the risks our students will face in extreme weather conditions. However, the three phases of Ranger training occur in different geographical locations—Fort Benning; Dahlongega, GA; and Eglin Air Force Base, FL. Although these locations are relatively close together, there's enough distance to create a unique set of environmental concerns for the training battalions in each area. And, despite our precautions, late last December a series of events resulted in a student suffering a cold weather injury that should've been avoided.

The student started complaining of pain in his right big toe on the fourth day of a field training exercise (FTX). The unit medics conducted foot checks in accordance with AR 350-1; they noted mild swelling and a ruptured, healing blister

on top of the student's toe, but no accompanying redness or warmth. They diagnosed a likely sprain aggravated by a bunion.

During the second FTX 4 days later, the student complained the pain in his toe was worse, but he didn't attend sick call on change of mission day. Although the student limped when he saw the medics, he didn't do so while being observed

FTX was over, at which time he returned to Fort Benning to begin processing for exodus leave.

Upon his return, the student was evaluated by a physician's assistant (PA) who told him to finish the oral antibiotics and seek additional treatment at his leave location if the condition worsened. While on leave a few days later, both the student's big toes swelled and, in his own



earlier in the day. The senior medic discussed this fact with the Ranger instructors (RIs) and told them to watch the student, whose original diagnosis remained unchanged.

The senior medic evaluated the student again the next day in the field during sick call. The student's toe was red and tender around the old blister, so the medic administered an oral antibiotic to combat the inflammation, which he assessed as cellulitis. The student was seen again the following day at the troop medical clinic (TMC). The TMC medics saw the student's condition was worsening and administered intramuscular antibiotics in addition to the oral medication he was already taking. The student continued taking the medicine until the

words, "hurt like hell." The tips of his big toes became discolored a couple of days later, so he visited a civilian doctor who changed the antibiotics and told the student to follow up with medical personnel when he returned to Fort Benning.

Back at Fort Benning, the battalion PA evaluated the student before his scheduled departure to Eglin and noticed the discolored areas. He referred the student to the brigade PA, who then diagnosed the student with second-degree frostbite on both toes. The podiatry department at the post hospital confirmed the PA's diagnosis the following day. The student received a medical drop, was given a 6-month profile, and instructed to contact the TMC at his home station for follow-up care.

The investigation into the incident revealed the underlying soft tissue infection and resultant swelling decreased circulation in the student's toes, greatly increasing the risk for a cold weather injury. This infection, coupled with repeated exposure to the cold, resulted in the student's frostbite injury. The student also didn't take responsibility for his own foot care, exacerbating the damage caused by the frostbite. He said the frostbite symptoms, including the discolorations, didn't develop until he was several days into his leave, and he didn't mention the symptoms during his multiple on-duty evaluations. No other students in the class reported any similar symptoms.

The Ranger School learned several lessons from this incident, and we'd like to share those with you now. First, distal extremities such as fingers and toes, areas of limited circulation, and exposed body parts, including the hands and feet, are much more prone to cold weather injury than the more insulated body areas. Likewise, Soldiers with underlying infections on those extremities are at even higher risk, as our student found out.

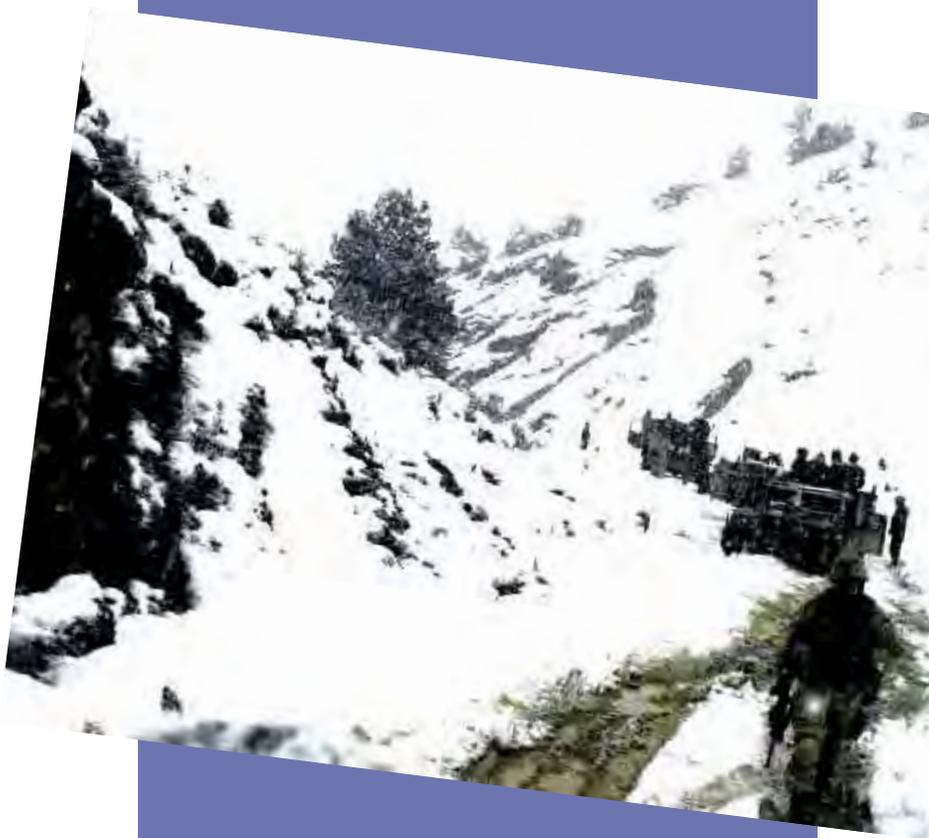
Our cadre are now more suspicious and thorough in their foot checks, especially during sustained training in inclement weather. They're also enforcing the students' sock and footgear changes to a higher degree. Hydration is another key issue our cadre are tackling in cold weather injury prevention. Our students and all Soldiers operating in extreme environments must continue to hydrate even when they don't feel like it.

Remember, cold weather injuries can happen even in the sunniest of places and to the most hooah of Soldiers. Our student spent 6 months on profile for a preventable injury when he could've been doing his duty as a Ranger instead. No one can change the weather, but we can adapt our behavior to beat it and fight another day. 

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DID YOU KNOW?

Frostbite can occur in as little as 30 minutes when an outside temperature of 10 °F is coupled with high winds, and even faster for lower temperatures. For this and other cold weather injury facts and prevention tips, visit the U.S. Army Center for Health Promotion and Preventive Medicine's Web site at <http://chppm-www.apgea.army.mil/>.



Getting the Big Picture

DON WREN
System Safety Engineer
U.S. Army Combat Readiness Center

It's been a few months since I wrote an article on

Composite Risk Management (CRM) pertaining to commercial off-the-shelf products—since last March, to be exact. A photo that accompanied the article and showed several unauthorized

HMMWV modifications, including a Claymore mine zip-tied to the front bumper, prompted several Soldiers to write *Countermeasure* with their concerns. The messages invariably said we at the U.S. Army Combat Readiness Center (USACRC) just don't know what it's like in theater and further explained the modifications are needed to carry out real-world missions in Iraq and Afghanistan.

The issue isn't that Soldiers and commanders truly need some vehicle modifications to fit their mission requirements, and we've never said not to do what's needed. What we have said, however, is every Soldier should step back and use CRM to determine the big-picture effects of their actions. In the case of vehicle modifications, the issues to be weighed include vehicle type, intended operations, and maintenance and logistics to keep the vehicle and equipment running.

One point of contention regarding the HMMWV photograph was the additional lights installed on the non-approved bumper, so let's start there. Lights like the set in the photo do indeed provide more



illumination for drivers in dark or dimly lit areas during patrols. This is a good thing, but you also have to look at what other hazards the lights might present for that vehicle.

Additional lights increase the electrical current drawn from the vehicle's systems. Currently, a standard HMMWV's alternator is at its calculated maximum output with all approved additions before anything else is added. I've received reports and personally seen additional equipment on HMMWVs that goes well beyond what's needed for the mission, including car stereos, coffee pots, and some things I don't even recognize. This extra wattage increases current flow, and the vehicle's wires can warm up to the point they ignite. Vehicle electrical fires aren't easy to fight, either, since most wires are hidden in the tiniest of spaces.

Have trouble believing this? It happens a lot more than you might think. A HMMWV in theater recently caught fire and burned to the ground; it and the mission equipment it was carrying were written off as total losses. The HMMWV was outfitted with some extra equipment that overloaded

its power systems, and the incident was attributed to "improper and unknown" wiring that caught fire. The crew escaped without significant injuries, but they probably had a hard time explaining to their commanders why \$200,000 worth of Army equipment was lying in a molten pile on the ground.

Here are some things to consider when installing optional equipment on tactical vehicles. Does the wiring include proper-sized wire and insulation for the current required to operate the equipment? Are the proper fuses in line and readily accessible to the crew inside the cab? How will the equipment be turned on or off? There are many more questions to be answered, but as you can see, it's often not as simple as merely installing something and expecting it to work.

When installing lights, here's something else to think about—shadows. Lights mounted close to the front grill have to shine through the Vehicle Push Assistance System. The bumper manufacturer doesn't mount their lights at the back of the bumper; they install them up front. The reason is this location eliminates shadows. The Army found that

headlights mounted behind slat armor create shadows for the drivers and anyone else looking forward on the roadway. The Program Manager-Brigade Combat Team assessed the hazard and moved the lights to shine up and over the armor to illuminate the entire driving area.

Commanders that allow their equipment to be modified become the program manager trainer, and logistician for the additional gear, so they must use CRM to mitigate any potential hazards associated with it. One recent example is a new vehicle that was designed, tested, and fielded by a program manager who set the vehicle's maximum safe operating speed at 55 mph. Field commanders who received this vehicle decided to modify the design out of mission necessity, but the changes made the vehicle unstable at the approved speeds. In response to this hazard, the commanders tested the modified system, determined a new maximum speed of 45 mph, and disseminated the updated guidance to their units.

The steps these commanders took are a model example of CRM. They identified and assessed the hazards, established corrective measures, implemented necessary changes, and maintained oversight while determining what factors would affect their mission. If left uncorrected, the speed hazard could've

affected their mission greatly in terms of lost time, equipment, and manpower.

Leaders must document their equipment modifications and forward an operational needs statement (ONS) to their Training and Doctrine Command representatives for review and possible inclusion in materiel changes. In the example discussed above, the unit submitted an ONS that ultimately was approved and forwarded to the program manager's office. Now another vehicle system that includes the field modification is in development, thanks to the foresight of that unit's leadership.

Our Army can no longer just "check the box" or be a compliance-based organization when it comes to safety. We must take it one step further and integrate CRM to assess all the threats and risks, whether they're from the enemy or the surrounding hazards, including our equipment and any modifications to it. CRM gives us the ability to fully recognize and answer the question, "What can take me or my buddy out of the fight?" Through this process, you and your leadership can take action to mitigate any risks, regardless your mission. Use CRM and stay in the fight! 

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Editor's note: The following paragraphs are excerpts from messages sent by Soldiers in response to the modified HMMWV featured in the March 2006 and May 2006 Countermeasure issues. The photo of the HMMWV was accompanied by a brief article explaining why the vehicle modifications seen in the picture were unapproved and unsafe. Both issues prompted several responses from readers in the field that, in turn, resulted in the publication of this follow-up article.

"The only thing I see totally off the wall is the Claymore (stupid). But there are units out there that don't have the luxuries of other units. We didn't get tow bars and other parts we needed for our gun trucks, so we and a lot of other units had to improvise. There are ways to modify parts to make your vehicle safer to drive, especially in the desert—bigger bumpers, extra lights, anything to give you an extra edge. There were days we had to bump vehicles, but the stock bumpers we had were garbage, so we had a bunch of bumpers and extra headlights put on our gun trucks. The extra headlights were needed especially to brighten up the roads to spot hazards. Tow bars were hard to come by in the desert and if you didn't bring any with you, you were stuck like chuck trying to order some."

SGT Felipe Hernandez

"I find it interesting that most all the modifications identified are commonplace here in Baghdad. The extra headlights on the vehicle grill and bumper are in place to better enable Soldiers to identify hazards in the road. The unapproved bumper and compatible tow bar are manufactured and sold by a company here in the AOR. We are fortunate there exists companies such as this one that come up with realistic solutions to problems the Army supply system has failed to adequately address. The chain is in place for fast recovery, although this task is more commonly accomplished with a tow strap. The driver side mirror is located in a lower position via brackets provided in the Fragmentation Kit 5 the Army provides! I can't comment much on the Claymore mine. While I agree it's ill advised, it does make quite a deterrent to would-be suicide bombers.

"What these Soldiers were thinking is SURVIVABILITY! You probably cannot imagine how much a Soldier on a 20-mph route regulation mission at 0400 appreciates extra light, or how beneficial quick recovery is when the enemy has mortars ready, or even how much safer it is to have a large bumper to provide some standoff and protection from barriers that must be breached. Never mind how important it is to have outward visibility after installing an armor upgrade. But I'm sure you'd disapprove of that armor too, since the M1114 wasn't equipped with it off the assembly line.

"Thanks for all the support. With all due respect, your ignorance speaks volumes. If any of you are interested in gaining a new appreciation for all those 'unauthorized modifications,' I have an empty seat waiting for you, or perhaps you'd like to be a gunner for a day. Hooah!"

SSG Joshua Holden

**Class A**

Two Soldiers died and two were injured when their M1025 HMMWV was rear-ended by a civilian tractor-trailer. The four Soldiers had completed a training exercise and were traveling to their barracks when the truck hit the HMMWV, which ran off the road and overturned several times. All four Soldiers were wearing their seatbelts and helmets, and the driver was traveling at an estimated 50 to 55 mph in a 65 mph zone with clear road conditions. The Soldiers sitting in the front and backseat passenger positions were ejected clear of the vehicle when their seatbelts sheared at the attachment points; both suffered moderate injuries and are expected to recover fully. The driver and driver-side backseat passenger remained inside the HMMWV and were killed during the rollover. The accident occurred during the late evening.

Class B

The gunner of an M1117 Armored Security Vehicle (ASV) suffered unspecified injuries when his vehicle struck an M923 5-ton truck. The M1117's driver was attempting to pass another vehicle when he steered the ASV off the roadway. He then overcorrected the vehicle and hit the 5-ton truck. Both the ASV and 5-ton overturned, and the M1117's turret was sheared from the vehicle during the rollover sequence. No other injuries nor seatbelt use were reported. The accident occurred during the early morning.



LOST

■ Soldier suffered a partial finger amputation when the M1114 HMMWV he was riding in hit a barricade and rolled over. The HMMWV crew was on a nighttime combat patrol mission and didn't see the barricade, which was sitting in the middle of the roadway, until they were too close to avoid striking it. The injured Soldier was serving as the vehicle's gunner and was taken to a local hospital for treatment. No other injuries were reported. The gunner and crew were using their restraint systems and wearing all required personal protective equipment (PPE). The accident occurred during the late evening.



Class C

■ Soldier suffered fractures to his arm when the Stryker he was riding in rolled over during a driver's training exercise. The vehicle was traveling on a tank trail when the driver trainee steered the Stryker up a steep embankment, causing the vehicle to roll over. The injured Soldier was riding in the back of the Stryker and was hurt when equipment stored in the vehicle's benches came

loose during the rollover and hit his arm. The Soldier was wearing all required PPE. No other injuries were reported. The accident occurred during the mid-afternoon.



Class A

■ Soldier suffered a fatal gunshot wound from another Soldier's 9 mm weapon. The deceased Soldier was on guard duty when he was shot in the chest with a round from the 9 mm, which the other Soldier was clearing. He was medically evacuated to a local combat support hospital, where he died a short time later. The accident occurred during the early morning.

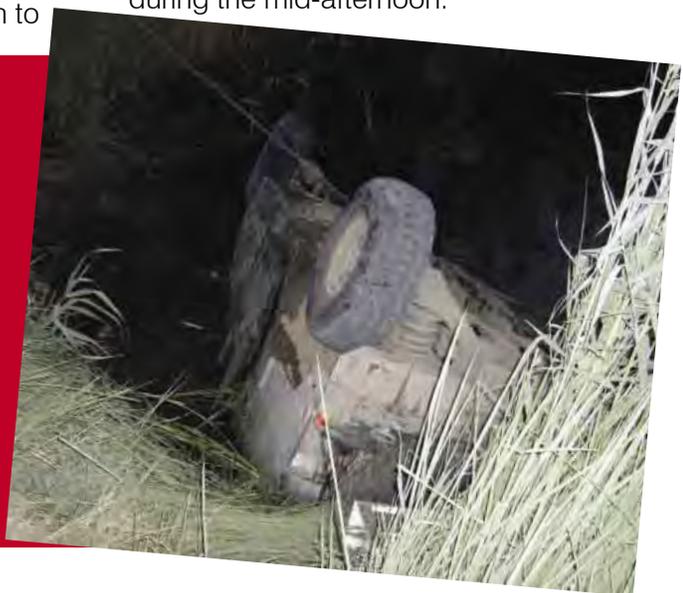
■ Soldier collapsed and died about an hour after playing soccer during organized physical training. No other details were reported. The accident occurred during the mid-morning.

Class C

■ Soldier suffered a gunshot wound to his left elbow when his weapon discharged in the unit armory. The Soldier was returning the weapon to

the armory when it fired. No other details were reported. The accident occurred during the late morning.

■ Two Soldiers suffered from heat exhaustion after completing a 5-hour daytime tactical road march. The first injured Soldier complained of feeling faint and weak just before the end of the march, at which time he was evacuated to a local hospital and treated for heat exhaustion. The second Soldier complained of nausea and dizziness while setting up tents about 20 minutes after finishing the march. He was given intravenous fluids, packed in ice, and evacuated to a local hospital, where he was diagnosed with heat exhaustion and received additional fluids and painkillers. Both Soldiers conducted the 7-mile march while carrying 35-pound rucksacks and wearing flak vests that were damp following an earlier rainstorm. The outside temperature was in the mid-90 °F range during the march, and the Soldiers were not given water until they reached the march's end point. The accidents occurred about an hour apart during the mid-afternoon.



Class A

■ Two foreign national civilians were killed when their vehicle rear-ended an M1114 HMMWV and spun into a canal. The HMMWV also crashed into the canal and landed on top of the car. Both civilians were pinned in the car beneath the water and drowned. No Soldier injuries were reported. The accident occurred during the mid-morning.