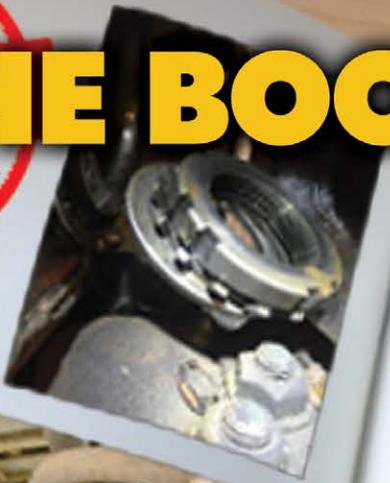


KNOWLEDGE

JANUARY 2017

OFFICIAL SAFETY MAGAZINE OF THE U.S. ARMY

BY THE BOOK



COCKPIT DISTRACTIONS p. 16
CREW COMMUNICATION p. 18

An illustration of a yellow car with a cracked windshield and a red helmet with a blue visor.

DRESS FOR THE CRASH p. 6



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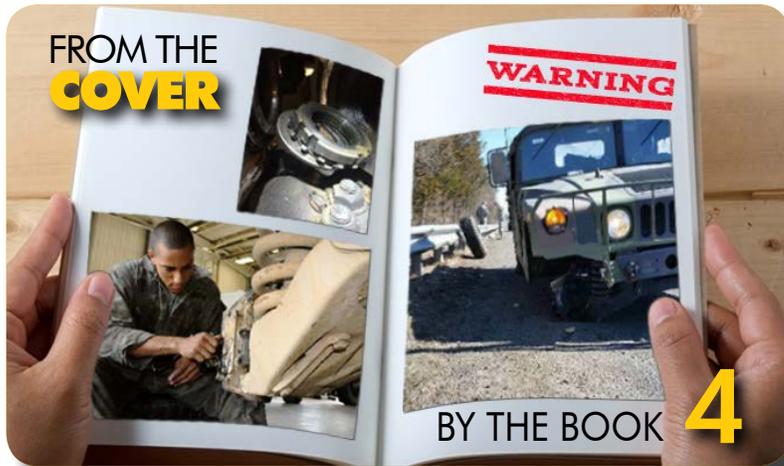
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Mission Statement:

The Army Safety Team provides the Army with safety and risk management expertise to preserve readiness through the prevention of accidental loss of our Soldiers, Civilians, Families and vital resources.

THIS MONTH CONTENTS

- 6 Dress for the Crash
- 8 One for the Books
- 12 Fit Risk
- 14 Fahrvergnügen
- 16 Small Distractions, Fatal Mistakes
- 18 Crew Coordination = Battlefield Success
- 22 The Wild, Dark Yonder
- 24 The Right Call
- 26 Move Over for Safety
- 28 Working on the Edge

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BY THE BOOK

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Whether you fly or drive, we've all seen those same famous words in our operator's manuals: NOTES, WARNINGS, and CAUTIONS! These simple messages are printed for a reason, and here is a recent example that highlights their importance.

Last year, an Army National Guard unit in my state was conducting a routine convoy movement from their home station to a field training site for the monthly drill weekend. Within 20 minutes of leaving, the lead vehicle experienced an abnormal vibration. The driver and crew both smelled smoke, followed by a loud noise and a sudden drop. The truck's right-front wheel had just flown off.

How did this happen, you ask? Well, it turns out the M1097 High Mobility Multipurpose Wheeled Vehicle has a long history of similar problems. But here's what you need to know. (WARNING: You may just learn something from this article!)

The M1097 HMMWV is one of the most widely used ground vehicles in the U.S. Army fleet. As a troop-carrying vehicle and prime mover, this type of HMMWV shares many common components with other vehicles and even uses the same maintenance manual. One unique feature of the HMMWV driveline is the geared hub assembly and spindle bearing. On the M1097, this system includes a lock washer and retaining nut that must be serviced and replaced after each semi-annual inspection.

When properly installed, the lock washer has slotted tabs that are bent into grooves on the retaining nut. This prevents the retaining nut from backing off while the vehicle is in motion. The service manual and repair procedure contain a very clear message: "WARNING, ensure

lock tab on lock washer is bent completely into the slot on the retaining nut." Guess what happens when you skip this step? The entire wheel falls off the vehicle!

Preventative maintenance checks and services, or PMCS as we all know it, is a crucial skill for vehicle operators. It's a basic task that is routinely practiced at the operator level and reinforced with good leadership. But can you blame a private first class if the wheel falls off his truck? Even if they did their PMCS? In this case, no. You have to dig a little deeper.

The higher headquarters unit conducted an on-duty National Guard accident investigation to determine what went wrong. They discovered the accident vehicle recently returned from reset maintenance. This type of PMCS is 20- and 30-level work that goes well beyond checking your tire pressure and oil level. The operator and crew were not at fault. The problem

in this case was a geared hub assembly that was not rebuilt correctly and then not checked by a mechanic supervisor. The warning message was skipped, and the vehicle was returned to the fleet. From the outside appearance, there was no indication of fault or failure even though anyone inside the vehicle could be



seconds away from a real disaster.

Did the mechanic intentionally ignore the warning message? I don't think so. Did the mechanic supervisor intentionally fail to check the mechanic's work? I doubt it. But right or wrong, the maintenance quality assurance process should have caught this problem. In the safety world, we call this type of mistake "human factors," and the majority of all Army accidents share this problem.

In the case of this HMMWV accident, no Soldiers were injured. The crew was wearing proper gear and driving the correct speed.

The M1097 veered off the highway and onto the shoulder, where it

was later recovered without incident. The accident could have been much worse if any of those procedures had not been followed. In the end, the only true cost was some pride and a few dollars' worth of common parts.

The lesson in this accident is simple: Pay attention to your safety messages! It turns out the retaining nut and lock washer on the M1097 is a well-documented problem. The first Safety of Use Messages describing the issue were published more than 10 years before this accident occurred. That was eight and half years before this young accident driver even joined the Army. He would have never known about this history. For those of us who have been on duty

for several years, this accident serves as a great reminder. Take time to read and understand older safety messages on your equipment and comprehend the impact.

Warning messages like the one discussed above are printed in the operator's and maintenance manuals for a reason. You need to take them seriously and make sure all of your subordinates do the same. Injury to personnel and damage to equipment will happen if you don't pay attention. After a maintenance task is completed, don't forget about quality assurance. Always have someone inspect your work. As leaders, operators and maintainers, it is our responsibility to do our jobs by the book. That goes for every

task, every standard, every time. If not, the wheels might come off when you least expect it! ■





my radial nerve being the worst. It was 10 months before I was able to raise my right arm. Almost a year a half after the accident, I still couldn't move my right hand. My repeated surgeries have left me with a titanium rod running the length of my humerus, a screw in my wrist and a 13-inch scar stretching down my arm from exploratory nerve surgery at Duke University Medical Center in Durham, North Carolina.

In May 2008, I got more bad news. My broken humerus hadn't healed and I'd need surgery to insert a metal plate and screws. Also, my wrist would require three more surgeries. I knew my flying days were probably over.

Still, as serious as those injuries sound, they could have been much worse. Despite the force of the impact, my protective gear did its job, protecting me from road rash, scrapes and cuts. I still have my jacket, which remains completely usable. My full-face Arai helmet did its job when I took out that window. I didn't suffer a headache, a sore jaw or even a loose tooth.

There is no substitute for the personal protective equipment specially designed for riders. I can't understand why anyone would want to ride wearing only a half-shell helmet, T-shirt, pants and no gloves. I'd rather dress so I'm always prepared for the worst. If that means

being a little uncomfortable because of the temperature, so be it. I'd rather be a little hot and sweaty because of my leather jacket than comfortable in a T-shirt with my arms completely unprotected should I crash. I don't even want to think about how bad my injuries would have been had I not been wearing my gear.

There is a saying among riders that goes, "Dress for the crash, not for the ride." I found out first hand that there is a lot of wisdom in that saying. ■

Just when you think you have it made in the shade as you're pulling sweet duty in Kuwait for a week or two, along comes a haboob that turns your ordinary night vision goggle flight into one for the books.

Our unit, Company B, 5/158th General Support Aviation Battalion, "Big Windy," was tasked to send three CH-47D from Iraq to Kuwait to transport Soldiers, Airmen and Seamen to and from Camp Bucca, Iraq. Most crews would assess this as a simple mission because they had performed it many times since Camp Bucca was established.

After arriving at Udairi Army Airfield, the crews spent the next few days going about their normal routine of preparing their aircraft, coordinating services, briefings and submitting flight plans. On day five of the mission, the flight was going as planned. The flight of three Chinooks was on its fourth turn back from Camp Bucca. The standardization pilot from Big Windy was giving me an instrument evaluation in the lead aircraft. In Chalk 2, we had the highest risk crew since this was only the pilot in command's second flight as PC. In Chalk 3, bringing up the rear, we had an instructor

pilot and the platoon leader.

As we took off on the fourth turn of the night, I thought our visibility had diminished to the west and mentioned it to my left-seater. He agreed and called Chalk 2 to get a weather update. We got a thumbs-up on the weather (sky - clear, visibility - 9999), so we continued to Bucca. We arrived for our fourth offload of passengers and, within 10 minutes, we were on our way back to Udairi for our fifth and final turn.

Throughout the evening, I had practiced instrument approaches into the airfield to complete my instrument evaluation. At 20 miles out, we broke off from the formation and started to climb to 2,000 feet and contacted Udairi ground controlled approach. During the

climb, we listened to the other two aircraft talk back and forth about how suddenly the visibility had lessened. I could still see the lights at Udairi some 15 miles away. However, within 30 seconds, we lost visual contact with those lights and, 20 seconds later, could not see the stars

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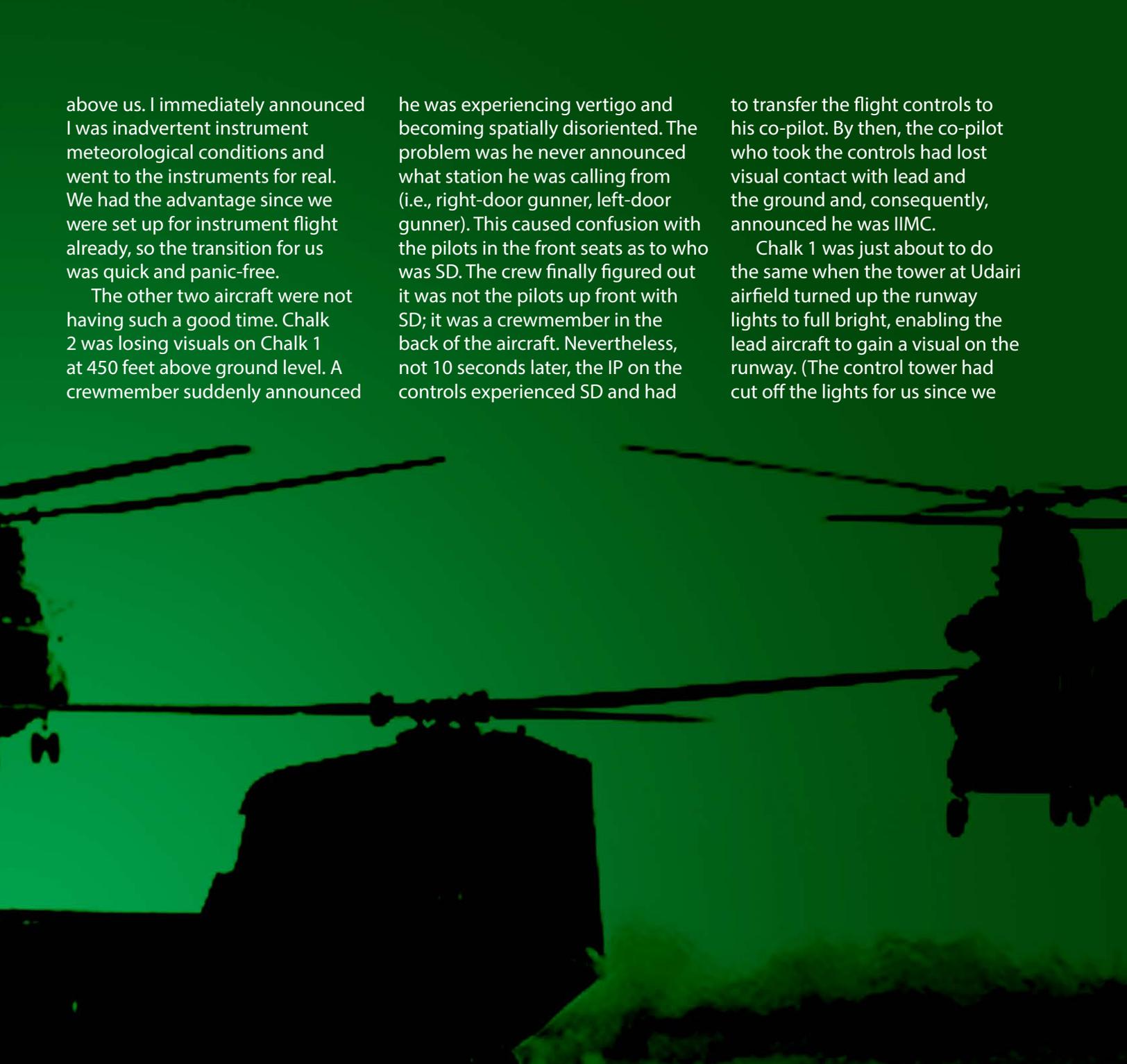
above us. I immediately announced I was inadvertent instrument meteorological conditions and went to the instruments for real. We had the advantage since we were set up for instrument flight already, so the transition for us was quick and panic-free.

The other two aircraft were not having such a good time. Chalk 2 was losing visuals on Chalk 1 at 450 feet above ground level. A crewmember suddenly announced

he was experiencing vertigo and becoming spatially disoriented. The problem was he never announced what station he was calling from (i.e., right-door gunner, left-door gunner). This caused confusion with the pilots in the front seats as to who was SD. The crew finally figured out it was not the pilots up front with SD; it was a crewmember in the back of the aircraft. Nevertheless, not 10 seconds later, the IP on the controls experienced SD and had

to transfer the flight controls to his co-pilot. By then, the co-pilot who took the controls had lost visual contact with lead and the ground and, consequently, announced he was IIMC.

Chalk 1 was just about to do the same when the tower at Udairi airfield turned up the runway lights to full bright, enabling the lead aircraft to gain a visual on the runway. (The control tower had cut off the lights for us since we



OKS

CHIEF WARRANT OFFICER 4 GLENN SIEGRIST
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Ansbach, Germany



were using NVG due to washing out of the runway on landing.)

My aircraft was vectored on downwind five miles east of the airfield at 2,000 feet mean sea level. Life was looking good for us. My left-seater pulled out Volume 7, Approach Plates, for our area and tuned in the TACAN for ALI AL SALEM AB, OKAS, in case we didn't break out of the dust storm while on approach into Udairi. The approach went well, as it should have, having two instrument examiners at the controls. I have to say our situation was very controlled compared to the first time this happened to me back in 1998 in Korea. That's another

story I'll have to share one day.

By now, the other aircraft had climbed to 1,700 feet MSL and was vectored behind us to bring it around for the 360-degree precision approach into Udairi. We contacted the final controller, who started us on a descent within seconds of establishing communications with him. We had a tailwind of 30 knots, so I slowed the aircraft to keep from having a high rate of descent while on the glide path.

At one point, we were falling out of the sky at 1,000 feet per minute just to stay on glide path. This was too quick, so I gradually reduced my airspeed to put the aircraft in

a safer rate of descent. I asked my left-seater to take the controls when he had visual with the runway. At 700 feet MSL, we broke out — only 100 feet above decision height for a missed approach. The left-seater announced he had a visual on the landing environment and took the controls, landing the aircraft abeam Charlie taxiway. We taxied off the active and turned into parking.

We tuned into the final controller's frequency and listened like concerned parents watching the driveway for their teenagers to come home after their first night out with the family car. We sat there listening to the controller transmit

FYI

A haboob is a type of intense sandstorm commonly observed in the Sahara desert (typically Sudan), as well as across the Arabian Peninsula, throughout Kuwait and in the most arid regions of Iraq. Haboob winds in the Arabian Peninsula, Iraq and Kuwait are frequently created by the collapse of a thunderstorm. During thunderstorm formation, winds move in a direction opposite to the storm's travel, and they will move from all directions into the thunderstorm. When the storm collapses and begins to release precipitation, wind directions reverse, gusting outward from the storm and generally gusting the strongest in the direction of the storm's travel.



"ALWAYS BRIEF A GOOD IIMC BREAK-UP PLAN WHEN FLYING NVG IN A DESERT ENVIRONMENT. WE DID THESE BRIEFINGS BEFORE EVERY FLIGHT AND THEY TURNED OUT TO BE EXCELLENT LESSONS FOR THE JUNIOR CREWMEMBERS."

heading adjustments to the pilots as the second aircraft made its way through the haboob: "On glide path, on course, three miles from touchdown, on glide path, on course." At one mile, with the help of NVG, we could see the aircraft break out from the haboob and land safely to runway 36. All back safe and sound!

I was proud of the crews that night. They all did as they were trained and brought their aircraft and buddies back home for more missions.

Lessons Learned

IIMC break-up plan. Always brief a good IIMC break-up plan when flying NVG in a desert environment. We did these briefings before every flight and they turned out to be excellent lessons for the junior crewmembers. They also reinforced why we conduct thorough briefings for every mission, no matter how routine or mundane the task may seem.

Crew mix. Just because you throw an IP into the crew mix to plus-up the crew for risk mitigation doesn't mean he will be a player when the chips are down. When the IP in Chalk 3 gave the controls to his co-pilot, the survival of the whole crew was placed in the hands of the weakest link. A side note to all aviation trainers: Ensure you're holding everyone to the standard; just good enough is

never good enough. Go the extra mile while training. You might not be around to see your hard work pay off, but you can bet there will be smiles on the faces of the crewmembers' families when their Soldier gets off the bus after a deployment. One day, that aviator may have the lives of all onboard in his hands while the high-time guy is trying to find his fourth point of contact with both hands.

Experience. From a distance, I sensed bad weather coming and, as an air mission commander, should have turned the flight around and waited for the weather to pass. Given my experience in operating in the desert environment and knowing that weather forecasting can be a best guess at times in Kuwait and southern Iraq, I should have gone with my gut feeling and not gotten caught up in the "just-one-more-turn-and-we-are-done" mindset. There are some things that cannot be trained, and only experience can teach you. Slow down and double-check your work if time permits. With 15-month deployment tours, we certainly were not short on time. During debrief, all crewmembers acknowledged at some point they had suspected reduced visibility. Remember the old adage: If you're thinking it, chances are some of the other crewmembers are too. Say something!

IIMC training. We were fortunate we had been operating in the area of operation around Udairi for a week and most of us had the opportunity to perform approaches into the airfield. Given the lack of IIMC training conducted in the AOR in Iraq, things could've turned out quite differently had this not been the case. Trainers should continue to look for opportunities to train instruments. I know it's difficult to find time with heavy mission loads and threat; however, the extra effort could save lives in the future.

Committed is committed. Once I announced I was IIMC and going to instruments, there should have been no second guessing. A few of our crewmembers in the back were continuing to call out when they saw a ground light flicker or a star above. This did not bother me; but with a more junior crew onboard, the temptation could exist for some to quit flying instruments and try to return to visual meteorological conditions. Trying to regain VMC has been a major contributing factor in many of the IIMC deaths in Army aviation. Crews should be briefed that once pilots are on the instruments, talk should be kept to a minimum so pilots can focus their attention on flying the aircraft. ■



FIT RISK

CHIEF WARRANT OFFICER 3 JOE GALBRAITH
A Company, 2-211th General Support Aviation Battalion
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A MRAP. EMOM. WOD. If you are familiar with these acronyms, then you have sought means of exercise beyond the average physical readiness training program. You are one of the millions of Americans that has participated in the phenomenon known as CrossFit. Not surprisingly, many Soldiers have also been drawn to this new style of exercise, in part because of its functionality related to the battlefield.

I belong to a neighborhood “box,” which is another term for a CrossFit gym. I can attest to the positive results I have seen in my Army Physical Fitness Test score since joining. Some argue this type of program may have above-average injury rates due to its intensity. While there are several studies on the subject currently underway, I can say I have remained relatively

injury free in the two years I have participated. I won’t attempt to further the debate on CrossFit injury rates. Instead, I want to provide some safety tips for those who are looking to join a CrossFit gym.

Like most others in the military, I often find myself on TDY to attend various types of training. This is a great opportunity to seek out other CrossFit gyms around the

country. It is fun to experience different locations, meet new coaches and members, and maybe even purchase a cool new T-shirt.

Even though most CrossFit gyms take great pride in this culture and brand, it is important to take appropriate precautions before participating. With the increase in popularity of CrossFit, more than one gym can usually be found in a given

location. Therefore do your research and be selective. Here are a few tips to follow when choosing a box:

- Check the gym's website.

Having a good website shows the operators are serious about their business. You should be able to find workout schedules, prices and even the coaches' bios. You can view pictures to see what types of equipment the gym offers.

- Try to attend with a friend.

That same guy or girl that has been making fun of you for your compression shorts and long socks may end up being a CrossFit convert. This, of course, will also increase safety. If an injury does occur, a friend will be handy when it comes to seeking treatment or reaching emergency contacts.

- Do a good recon of the location.

Most of these gyms are in repurposed warehouses that may be in less-traveled parts of town. Ask locals if that part of town is safe.

- Drop in early to view the previous workout. Is the coach involved? Do they use proper technique? Do they do a good warm up and cool down?

- Ensure the gym has serviceable equipment and it is kept in a sanitary condition. Do they inspect bars, ropes, racks, etc.? Do they have cleaning products available to wipe down equipment? According to the Centers for Disease Control and Prevention, methicillin-resistant staphylococcus aureus, or MRSA,



which is also known as a staph infection, can infect athletes that share surfaces and equipment.

- Acclimate yourself to the local climate. Changes in humidity, temperature and elevation may not allow you to perform as you did at your home gym. Take a session at half speed before going right into your Rx, or prescribed workout.

Whether you are a competitor training for the CrossFit Games or just trying to improve you APFT score like me, make sure you are prepared. As professional Soldiers, we should always manage the risk involved in everything we do. 5, 4, 3, 2, 1 — Go! ■

FYI

Currently, CrossFit gyms can be found in 142 countries across all seven continents. For those unfamiliar with CrossFit, here are some popular acronyms and terms used at the gyms.

EMOM = Every Minute on the Minute

AMRAP = As Many Rounds As Possible

WOD = Workout of the Day

Box = Gym

Rx = Prescribed work out





Fahrvergnügen, or driving pleasure, is something one can truly experience in Germany. When I was a young Army sergeant, my first duty station was in Baumholder. Initially I didn't own a car, so I traveled extensively using Deutsche Bundesbahn, the German federal railway system. Once I saved enough money, though, I purchased a Volkswagen Golf GTI. It wasn't a very attractive car — when compared to other vehicles on the German roads — but it was fast. After a few short trial runs through the countryside around Baumholder, I decided I was now ready to see the rest of the country via the German highway system, the world famous Autobahn.



Germany has the world's second largest road system (after the U.S.). There are 636,000 km of roads providing paved access to even the most remote corners of the country. The roads in Germany are well-engineered and Autobahn maintenance is superb. Rarely will one find a pothole, and snow removal is almost instantaneous. Crews inspect every square meter of the system periodically using vehicles with high-tech road-scanning equipment. When a fissure or other defect is found, the entire road section is replaced. Signs, barriers and other features are also well maintained.

The Autobahn has an extensive system of service areas (Rasthof), generally spaced between 40 and 60 km apart. There are more than 700 service areas in operation and they're open 24 hours a day. These service areas usually feature a filling station (Tankstelle), restaurant or snack bar, convenience store, telephones and restrooms.

Although two-thirds of the Autobahn network has no permanent speed limit, there is an advisory limit of 130 km/h (81 mph). Despite the prevailing high speeds, the accident, injury and death rates on the Autobahn are remarkably low. In fact, the annual fatality rate (2.7 per billion km in 2009) is consistently lower than that of most other superhighway systems, including the U.S. interstate system (4.5 in 2009).

To safely facilitate heavy, high-speed traffic, special laws apply when driving on the Autobahn, such as:

- Passing on the right is strictly prohibited! Slower vehicles must move to the right to allow faster traffic to pass, and drivers should stay in the right lane except to pass. When passing, you must do so as quickly as possible.
- Many drivers flash their high

beams or switch on their left turn signal to politely (or not) request that you vacate the left lane to let them pass. There are conflicting opinions about whether this is legal or not and why, but there are reports that drivers have been cited for doing this.

- Stopping, parking, U-turns and backing up are strictly prohibited, including on shoulders and ramps (except

“BY KNOWING THE BASIC RULES OF ENGAGEMENT OF THE GERMAN ROAD, ONE CAN ENJOY THE HISTORY AND THE BEAUTY OF THE GERMAN COUNTRYSIDE WHILE SIMULTANEOUSLY EXPERIENCING TRUE FAHRVERGNÜGEN.”

for emergencies, of course.)

- Traffic entering the Autobahn must yield to traffic already on the Autobahn.
- During traffic jams, motorists in the left lane are required to move as far to the left as possible and those in the adjacent center or right lane must move as far to the right in their lane as possible, thus creating a gap between the lanes for emergency vehicles to pass through.
- Motorists at the rear of a traffic jam usually switch on their hazard blinkers to warn approaching traffic of the slowdown.
- It is illegal to run out of fuel on the Autobahn. Technically, there is no law specifically against this, but it is illegal to stop unnecessarily on the Autobahn and this law is also applied to people who run out of fuel, as such an occurrence is deemed to be preventable.
- Drivers should also be aware that, unlike the U.S., directions on the Autobahn (as well as

other roads) are not given using the cardinal directions (north, south, east and west), but by destination cities. Know what the major cities are along your route before you start out.

If you have an accident, breakdown or other emergency along the Autobahn, you are never more than a kilometer away from help. Emergency telephones (Notrufsäule) are located at 2 km

intervals along the sides of the road. The direction to the nearest phone is indicated by small arrows on the roadside reflector posts. All calls go to a central call center in Hamburg.

In the event of an accident, dispatchers in Hamburg will immediately connect the caller to the nearest

police or emergency services office. For breakdowns, the dispatcher will obtain the information necessary to send the appropriate service. German law requires all automobiles have a portable red reflective triangle and a first aid kit in their trunk. If a car is stopped for any reason, the triangle must be placed 200 meters behind it if on the Autobahn and 100 meters behind it on all other roads. The car's emergency flashers should also be turned on. Good Samaritan laws also require that you stop and render aid should you be one of the first to arrive at the scene of an accident.

Driving on the German Autobahn is very different than driving on an American highway. The differences, however, should not be a deterrent. By knowing the basic rules of engagement of the German road, one can enjoy the history and the beauty of the German countryside while simultaneously experiencing true Fahrvergnügen. ■

SMALL DISTRACTION FATAL MISTAKES

CHIEF WARRANT OFFICER 2 JAMES B. HILLIARD
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12th Combat Aviation Brigade
Illesheim, Germany

The mission was a standard ferry flight that the unit had done many times to a training area in Germany. For training purposes, the company standardization pilot wanted the younger pilots in the company to build a new route using the Aviation Mission Planning System computer. The pilots were to then brief the company on the new route. Due to system limitations, the pilots split the route into two segments. Upon reaching waypoint six, the flight would switch to the second route and continue to the destination.

I was in the front seat of the lead Apache in a flight of six departing for the training location. Everything from communications check to takeoff went as planned. I noticed the route shown on the tactical situation display took the flight past waypoint six and into the

route structure of the training area.

I was on the controls and the aircraft hold modes were activated. Upon reaching waypoint six, the pilot in command in the backseat switched the route as briefed. To our surprise, the route disappeared from the TSD. The PC and I started discussing

S,

what happened. During the discussion, the PC wanted to take the flight controls. We did the three-way positive transfer of control and I released the controls. I then changed back to the original route.

A few moments later, the PC said we were left of course. I concurred. Moments later, the PC said we were going farther left of course. Once again, I concurred. A few moments later, the PC said we needed to come right and get back on course. I hesitated for a second and asked if he had the controls. "Oops, I forgot," was his response. Sometime during the confusion with the route, the PC forgot we'd transferred controls. For about five minutes, no one was flying the aircraft. It was the hold modes that kept us straight and level.

There is a standard word association used in the aviation community. We hear a command and, without hesitation, almost

"THERE IS A STANDARD WORD ASSOCIATION USED IN THE AVIATION COMMUNITY. WE HEAR A COMMAND AND, WITHOUT HESITATION, ALMOST SUBCONSCIOUSLY GIVE THE RESPONSE — SOMETIMES WITHOUT TAKING ACTION."

subconsciously give the response — sometimes without taking action. Because it is hard for the pilots in the Apache to see each other, it can be difficult to know if the action was completed without verbal confirmation. This has led to accidents where no one was flying the aircraft.

Continue to practice proper crew coordination. Don't take it lightly. The smallest distractions can lead to a fatal mistake. ■

CREW

RETIRED CHIEF WARRANT OFFICER 4 SEAN MORRILL
III Corps Safety
Fort Hood, Texas

COORDINATION =

Technological advancements continue to provide today's Soldiers with greater capabilities than ever before. Armor enhancements, ballistic glass and additional mission equipment in Army vehicles all offer extra protection on the battlefield. However, these advancements have come at a price for vehicle crews who've had to cope with restricted outside visibility and altered vehicle handling. As the Army continues to improve and upgrade its combat vehicles, the need for effective crew coordination and communication has become essential for crews to safely complete their missions.



BATTLEFIELD SUCCESS

Army aviation has long used aircrew coordination, a system that improves a crew's interaction and efficiency, in safely accomplishing their missions. This time-proven program reduces accidents and improves the effectiveness of crews in both peace and wartime. The good news is this system is easily transferable to Army vehicles and can equally benefit ground crews.

Basic qualities of effective crews

Effective vehicle crews are made up of assertive crewmembers who provide input to the vehicle commander. Every crewmember knows they're a part of the team and are willing to help without being asked. The entire crew acts as a team in mission planning, execution and after-action reviews and, with the exception of short-notice missions or high-workload conditions, analyzes information and contributes to decisions.

Vehicle commanders establish an open, professional climate at the beginning of every mission. Effective crews maintain this atmosphere by communicating vital information in a clear, timely manner so conditions, actions and decisions are easily understood. Finally, effective crews

view AARs as learning experiences that can enhance future crew performance. Some good crews do these things without having a background in crew coordination training. They intuitively know they need to have open communications, provide professional input and work as a team in support of the vehicle commander.

Crew coordination objectives

The aviation crew coordination system has five main objectives that can be observed, sensed and measured. These objectives also can be applied to ground vehicles.

- **Establishing and maintaining team relationships.** Vehicle commanders create an open crew climate and maintain it throughout the mission. Good vehicle commanders use their authority, but don't operate without input from the rest of the crew.

- **Mission planning and rehearsals.** Pre-mission tasks, inspections and checks are completed by the crew. The crew discusses and thinks through contingencies like rollovers, fires, casualties and actions on contact.
- **Establish and maintain workload levels.** Actions are prioritized and workloads distributed equally or in a way that makes the best sense.
- **Exchange mission information.** Crews send information in a clear, timely and complete way.





- **Cross-monitor performance.** Crewmembers mutually cross monitor each other to ensure tasks get done and to enhance crew situational awareness.

Crew coordination elements

The aviation model also defines basic crew coordination elements as things individuals in a vehicle crew can do to enhance overall crew effectiveness. Explanations and examples of each for vehicle crews are as follows:

- **Communicate positively.** Positive crew communication ensures the message gets through.
- **Direct assistance.** Vehicle crews should direct assistance when they need it.
- **Announce actions.** Announcing actions ensures everyone is aware of what is happening.
- **Offer assistance.** Offering assistance to a crewmember who is especially busy or needs help benefits the whole crew and is something all should be prepared to do without being asked.
- **Acknowledge actions.** Acknowledging actions ensures those taking them know that everyone is aware. A "Roger" callout may be all that is needed and maintains crew situational awareness.
- **Be clear and precise.** Using plain or standardized terms and avoiding slang ensures

everyone understands what you're saying. Ambiguous words or phrases like "I have it" or "Right" can have more than one meaning and bring about an incorrect response.

- **Provide vehicle control and hazard advisories.** All crewmembers should be prepared to assist the driver in avoiding road hazards, traffic, canal edges or other things they may not see due to the reduced visibility in up-armored Army motor vehicles and Army combat vehicles.
- **Coordinate action sequence and timing so crew actions mesh.** Sequencing actions and timing can be critical during weapons engagements, loading of ammunition, turret movements and while maneuvering the vehicle in combat.

Standard crew terminology

Standardized words and phrases, such as those used in radio transmissions, help crews avoid confusion and allow them to react more quickly and efficiently. Using words known by everyone in the crew also prevents them from having to be repeated. If the operator's manuals have a standard callout or term for a piece of equipment, get in the habit of using it, especially if a new crewmember joins the team. If someone doesn't understand what you said, try saying it another way or

in clearer terms instead of repeating it multiple times or raising your voice.

Situational awareness

To ensue the whole crew maintains situational awareness, keep an open flow of information. Also, keep chatter or nonrelevant conversations to a minimum. Conversations should be sterilized to mission-focused communications during critical times or events. The vehicle's intercom system should be used to enhance crew communications and checked prior to the mission to ensure it works. Be sure to clarify if what you said is not understood. Likewise, ask other crewmembers if you don't know what was said or is happening.

Crew coordination is more of an art than science and requires continuous practice. Good crews constantly work on improving their coordination and use AARs as a forum for future crew improvement. These combat-proven techniques can help you better accomplish your missions and prevent accidents. Discuss these methods with your crew and practice them on every mission. I think you'll find you're glad you did. For more information, see aircrew Training Circulars 1-248 or 1-219. Both can be downloaded from the Army's Publishing Directorate website at <https://armypubs.army.mil/>. ■



Standardized words and phrases, such as those used in radio transmissions, help crews avoid confusion and allow them to react more quickly and efficiently. Below are examples of some common words or phrases a crew might use and their meanings.

WORD or PHRASE	MEANING
Affirmative	Yes
Cease fire	Command to stop firing but continue to track
Clear	Clear of obstacle or traffic (e.g., clear right)/Weapon is clear
Execute	Command to initiate an action
Firing	Announcement that a weapon is to be fired
Get out!	Command to make an emergency exit from vehicle (say 3X)
Hold	Command to hold present position
Maintain	Command to continue or keep the same
Monitor	Command to maintain constant watch or observation
Move	Command followed by direction (forward, back)
Negative	No, incorrect or permission not granted
Now	Indicates that an immediate action is required
Report	Command to notify
Roger	Message received and understood
Rollover!	Command to brace/take immediate rollover actions (say 3X)
Say again	Repeat your transmission
Slow down	Command to reduce speed
Speed up	Command to increase speed
Stop	Command to go no further, halt present position
Target	An alert that a threat has been spotted
Traffic	Refers to another vehicle, followed by a clock position
Turn	Command to deviate from current course, followed by direction
Unable	Indicates inability to comply with instruction or request
Up on	Indicates inability to comply with instruction or request
Weapons Red/ Amber/Green	Indicates loaded status of weapon
Weapon on fire/safe	Indicates status of weapon selector switch
Wilco	I have received your message, understand and will comply

THE WILD, DARK

The PCS gods had smiled upon me and I had orders from Fort Rucker to Korea with a follow-on assignment in Hawaii. “What a deal,” I thought. I’ll just drive my Jeep Wrangler to California and have it shipped to Hawaii, where it can be waiting for me. And, to boot, during the drive, I’ll stop in Salt Lake City for a few days to visit my daughter.

I’d driven cross-country three times in the past and thought I knew my limits. I particularly enjoyed driving at night because there was less traffic. However, in the past there was at least one other person in the vehicle with me. This time I would be going solo.

All went well until I got to Denver. There I’d planned to get off Interstate 70 West and go north on I-25. Ultimately, I intended to go west on I-80 and then take I-84 to Salt Lake City. I was feeling pretty good when I got to Denver and it was still daylight, so I decided to continue on. If I kept my pace, I figured I could make it to Salt Lake City by early evening.

But wouldn’t you know it; things didn’t quite go as planned. Maybe I was daydreaming, but somehow I missed my turn onto I-25. By the time I caught my mistake, I had already gone 25 miles. As I looked at the map, I figured I’d lose too much time going back. And if I continued on I-70 West, I’d be going too far south. So what could I do?

I looked at the map and saw a highway through the mountains that would take me to Salt Lake City. I decided to take it — thinking I might make it to Salt Lake City even sooner than

originally planned. Unfortunately, I was way off on that calculation. Just because a highway is on a map doesn’t mean it’s a major road. The highway went through several towns, and with the resultant stop lights and stop signs, it was much slower going than on the interstate. By the time I got to the Colorado-Utah border, the sun had gone down and it was already past my original arrival time. At least the highway had transitioned to four lanes with a faster speed limit. I finally made it to the Utah side and was driving down a mountain. I figured everything was still going to work out and that I’d get to visit with my daughter that night. That is, until it started to snow.

My headlights were little help. They only illuminated the area about 50 feet in front of me, and using my high beams didn’t help. To mitigate my risks, I slowed to 35 mph. However, now I was losing time; so, since no one else was on the road, I decided to speed up a little. As I pushed down on the gas pedal, I lost control and the Jeep began sliding. I spun 1½ times and wound up facing the wrong direction. Good thing no one else was on the road.

After I got myself together, I turned around and started driving again. As before, I started out

slowly and, as my confidence increased, so did my speed. After all, I was in four-wheel-drive vehicle. I thought that would keep me out of trouble. All was going well until I increased to about 35 mph and started spinning again — only this time it was worse than before. As I tried to regain control, I glanced to the right and saw it was pitch black and there weren’t any guardrails. Apparently, there was a drop off on the right side of the road and I was heading toward it. I figured I was about to launch into a giant black hole when, suddenly, there was a jolt and loud thud.

Thankfully, the Jeep stopped. I’d struck a cement barrier on the highway’s shoulder — the last impediment before I would’ve launched into the wild dark yonder. Once my heart began beating again, I got out to assess the situation and the damage to my Jeep. I’d hit the first barrier only about two feet from where it began. How lucky was that! If not for the barrier, I’d have gone down a very steep slope. The Jeep would’ve probably rolled and everything inside bounced around and knocked me unconscious. Who knows



WONDER

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how long it would have been before someone found me.

The damage to my Jeep was limited to having the left-rear tube bumper bent in about 4 inches. This event could've ended up much worse; but the truth is this didn't even have to happen in the first place. Fortunately, I survived and gained some useful lessons learned.

First, I should've stayed on the interstates as planned. Even though the distance may

be farther by traveling on an interstate, the higher speed limits and lack of cross traffic, stop signs and signals make them safer and often quicker. Second, check the weather before you head out and have some emergency supplies in your vehicle just in case you get stranded. Third, check how your vehicle handles in the snow. Understand that just because you have a four-wheel-drive vehicle

doesn't mean you'll always be able to maintain traction on slippery roads. Fourth, let someone know your route and inform them of any changes you make along the way. And finally — as I learned the hard way — don't be in a rush and drive fatigued. You might end up missing your destination — permanently. ■

As a young warrant officer on my first assignment out of flight school, I was chomping at the bit to go out and do great things. I considered myself fortunate to be assigned to Joint Tactical Force Bravo at Soto Cano Airbase in Honduras, a unit with an active peacetime mission.

For the first several months, I flew hundreds of hours under the mentorship of many great pilots, some Vietnam-era aviators near the end of their careers. With only one dot on my bar and about four months left on my tour, I received pilot in command orders and was told to make the commander proud.

My first assignment as a new PC was a five-day mission to deliver Air Force medical personnel to several small villages to conduct immunizations of Honduran nationals. My UH-1 was old, but she cleaned up nice. I was looking forward to the challenges of pre-global positioning system navigation using only charts and time/distance/heading to navigate to settlements that, in many cases, were nothing more than a cluster of huts in the middle of nowhere.

The initial leg of the flight was

a long one. The first hour or so was filled with the happy chatter of a crew with good morale and glad to be in the air doing their job. The crew chief pinned open the doors and, after about an hour, boredom settled in. The warm breeze and the steady whine of the T-53 engine overhead threatened to put everybody asleep in the back.

The door gunner came on the intercom and suggested we spice up the flight by dropping down and doing some terrain flight along a narrow, winding river below. His suggestion was met with a chorus of approval from the rest of the crew. I could see the passengers were excited over the possibility.

During our mission-planning brief, we discussed low-level modes for this type mission. The rule was low-level modes were to be used "as necessary," and the unit

standing operating procedures left this up to the PC's discretion. My first thought was that low-level flight really wasn't "necessary" at this point in the mission, but the temptation was there to have a little fun and treat the troops to some turn-and-burn excitement.

After months of doing what other PCs wanted to do, the decision was now up to me. Since I hadn't yet given a flat "no" to the idea, the crew sensed I might be on the fence. Now the pressure came from all sides. The intercom was jammed with, "Come on, sir!" and, "Let's do it!" The Air Force colonel in charge of the medical detail borrowed the door gunner's headset and challenged me to, "Show the Air Force how it's done." Even my co-pilot, a captain, joined in.

I had learned long ago to trust my

THE RIGHT CA

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gut, and an unplanned deviation for a joyride just didn't pass the gut check. They weren't going to leave it alone, so a go/no-go was required. There was universal disappointment when I rendered my decision of "negative."

We continued the mission, visiting more than a dozen villages over the next two days. On the third day, I noted the next village on the list was located on the same river where I had previously declined to fly low level. I conducted a recon of the landing and pickup zones prior to landing. The first thing I noticed was the village actually straddled the river — half the village on one side, half on the other.

On short final, I detected a steel cable strung across the river between the two settlements. I inspected the cable after landing and estimated it to be about 2 inches in

diameter. The cable was used to slide messages and packages from one side of the river to the other. Then it hit me like a bolt of lightning. If I had chosen to run the river at low level, my helicopter would've likely collided with that cable! At 90 knots, the wire strike protection system wouldn't have been effective against a cable that large and the collision would've been catastrophic. In short, my aircraft, crew and all aboard would have been dead at the bottom of the river.

I called the crew over and showed them the cable.

Asking the group if they remembered their request

to fly low-level, I let the significance of what I was showing them sink in. Our crew chief just shook his head and said, "Good call, sir." Several times over the next few days, he stopped whenever he saw me and repeated, "Good call, sir."

This incident drove home many lessons for my crew and me. I made the right call on this occasion, despite heavy pressure from my entire crew and some senior officers. However, I fault myself for even considering it. In this case, wrong would have meant dead. As aviators and Soldiers, we are risk takers by nature and necessity, but we don't have to be risk seekers. ■

ALL





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Serving as a state trooper in Missouri for many years, I learned that merely approaching a car during a traffic stop or working roadside while investigating an accident were two of the most dangerous duties we perform. Over the years, I've been bumped by a mirror, forced to jump on the hood of my patrol car and run from out-of-control vehicles more times than I'd like to recall.

To reduce the hazard for law enforcement officers and other emergency responders, all but seven states have enacted a "Move Over" law. Typically, the law requires motorists to change lanes and/or slow down when approaching stationary emergency vehicles with emergency lights

activated. While each state statute differs significantly in the specific provisions, they all have two common goals — to provide a buffer area between emergency responders and moving traffic and to reduce the speed of passing vehicles.

Why is this law important to you? Emergency responders working

roadside are putting their lives on the line every day to help preserve your life if you are in an accident. Consider that according to the National Institute for Occupational Safety and Health, in 2005, 390 emergency responders died when other vehicles struck them. Those deaths accounted for 7 percent of all fatal occupational injuries that year.

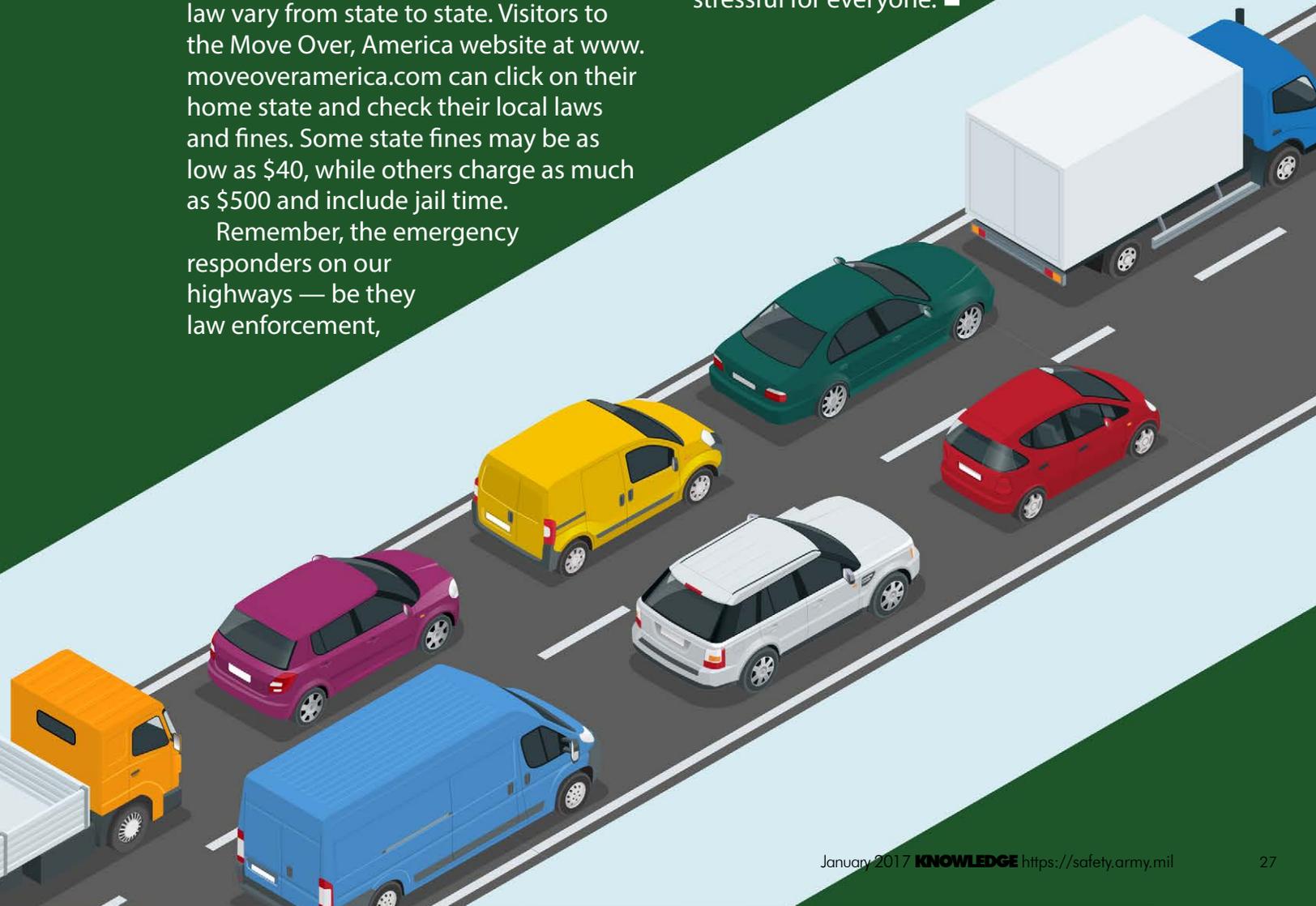
As well, www.respondersafety.com reports that, on average, each day two emergency responders are struck by passing vehicles. To make matters worse, according to a national poll by Mason Dixon Polling and Research and sponsored by the National Safety Commission, 71 percent of Americans have not heard of Move Over laws.

Fines for violations of the Move Over law vary from state to state. Visitors to the Move Over, America website at www.moveoveramerica.com can click on their home state and check their local laws and fines. Some state fines may be as low as \$40, while others charge as much as \$500 and include jail time.

Remember, the emergency responders on our highways — be they law enforcement,

“IF YOU CANNOT MOVE OVER, SLOW DOWN. SURE, IT MAY ADD A MINUTE TO YOUR TRIP, BUT IT COULD SAVE THE LIFE OF ANOTHER.”

emergency medical or fire service, or wrecker operators — are performing a service on behalf of you. Give them a break and move over if it is safe to do so. If you cannot move over, slow down. Sure, it may add a minute to your trip, but it could save the life of another. By observing the Move Over law, we can all make the roadways safer and less stressful for everyone. ■

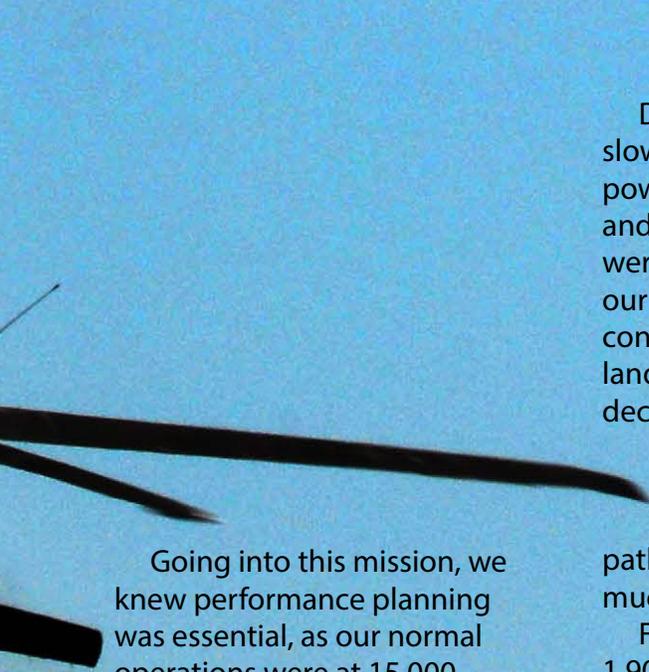


WORKING ON THE EDGE

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I once experienced a situation where power management and performance planning were of utmost importance. I was on a firefighting mission in central California, flying a UH-60A. The average mission condition was a 15,000-pound aircraft with a 4,000-pound water bucket working between 4,000 feet mean sea level/30 C and 6,000 feet MSL/25 C.





Going into this mission, we knew performance planning was essential, as our normal operations were at 15,000 pounds and 1,500 feet. Our initial calculations showed we did not have out-of-ground effect capability at 6,000 feet and only marginal performance at 4,000 feet, which meant we couldn't perform water bucket operations.

One control measure we put into play was eliminating any nonessential equipment and passengers. Next, we used our performance planning cards and a U.S. Forestry Service helicopter load card to calculate the amount of fuel we could take on because we couldn't reduce our bucket weight any further. We found our max gross weight OGE for the conditions, subtracted the aircraft and full bucket weight, and the remaining weight was the maximum fuel we could have onboard.

We chose the best approach paths, using the wind to our advantage for performing max gross weight approaches because of our low power margins. We kept track of the winds by observing smoke drift and ripples on the water since the automated weather observation system and automated surface observing systems were not available or accurate in the mountains.

During approaches, we slowed down early and got the power back in to avoid mushing and transient rotor droop. We weren't always able to choose our landing direction (helicopter controllers sometimes dictated landing direction for traffic deconfliction because there were many aircraft working the fires), but we tried to use the longest approach paths with the shortest trees as much into the wind as possible.

Fuel on board was normally 1,900 to 2,000 pounds, which translated to about 2½ hours of endurance. Since we reduced our fuel, we then had to be more vigilant with fuel management, especially with constantly

“THIS MISSION REINFORCED THE IMPORTANCE OF PERFORMANCE PLANNING, CREW COORDINATION, FUEL MANAGEMENT, POWER MANAGEMENT AND LANDING ZONE SELECTION.”

changing conditions of gross weight and density altitude. By efficiently managing our fuel, we were able to deliver more water on fires, knowing exactly how long we could stay on station and how much fuel we needed to get back to base with our appropriate reserve.

I found the -10 was accurate with the fuel storage. The first water load with the Bambi Bucket of each mission was right on the edge of our power margin at 6,000 feet. As the mission progressed, we gained more and more power as we burned off fuel. In power-critical situations, crew coordination and familiarity are key, as you know what to expect

from each other and what calls the other pilot needs to hear to be effective. Because of this fact, we used battle rostering as a control measure and it worked well.

This mission reinforced the importance of performance planning, crew coordination, fuel management, power management and landing zone selection. Power management is critical when operating at the edge of the performance envelope. After these missions, I realized training at the High Altitude Army Aviation Training Site in Gypsum, Colorado, would be invaluable. This course is essential for both wartime and peacetime missions because it teaches crews to properly use

their performance planning, crew coordination and mission planning for all scenarios. These types of missions are becoming more common with our resources stretched.

Because of the Overseas Contingency Operations and as professional aviators, we must stay vigilant, know our aircraft, use proper crew coordination, understand the mission and always use proper pre-mission planning. Today's modern aircraft are extremely powerful and capable. However, there is always that time when we'll be working on the edge of power available and we must be ready for it. ■

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**Don't ride alone.
Mentor a battle buddy!**

HERE IT COMES

Ride Safe, Ride Long!



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