PREVENTING ARMY VEHICLE ROLLOVERS p. 4

SUMMER WEATHER HAZARDS p. 10
DRIVER TRAINING p. 20
RIDER COMPLACENCY p. 24

FIVE QUESTIONS IN MISHAP INVESTIGATIONS p. 14
The U.S. Army Combat Readiness Center has developed multiple tools to provide leaders information on risk mitigation, all available at https://safety.army.mil, including the following:

- **Army Readiness Assessment Program** — a web-based tool that provides battalion or equivalent commanders with data on their formations’ readiness posture by sampling unit safety climate and culture in five key areas: process auditing, reward systems, quality control, risk management, and command and control.

- **Army Risk Management Information System** — the central repository for all Army mishap data (Class A-D ground, on and off duty; Class A-E aviation). RMIS is designed to give leaders, safety officers, and other personnel access to both current and archived mishap reports, with a goal of preventing similar incidents within their formations. Among other functionalities, users may search RMIS for specific mishaps by case number; conduct searches for a given timeframe or accident class; and obtain risk and hazard reports broken down by age, grade, equipment and additional variables. All data retrieved from RMIS is classified For Official Use Only and limited in use to accident prevention.

- **USACRC Lessons Learned** — one-page mishap investigation summaries produced for accident prevention purposes. Summaries contain information protected by DODI 6055.07 under safety privilege and are available only to CAC holders within the .mil network.

- **Joint Risk Assessment Tool** — a mission planning tool developed to augment the military decision-making posture by sampling unit safety climate and culture in five key areas: process auditing, reward systems, quality control, risk management, and command and control.

- **Preliminary Loss Reports** — short synopses of recent Army mishaps resulting in Soldier or civilian employee losses that alert commanders, leaders and safety professionals to circumstances affecting readiness. PLRs provide actionable knowledge and real-time information regarding accidental fatalities, both of which are critical in prevention through risk management.

- **Safety Campaigns** — a monthly focus on seasonal and non-seasonal risk management products and tools. Each monthly topic includes supporting videos, graphics and posters, articles and external links for additional resources.

- **Risk Management Magazine** — the official safety magazine of the U.S. Army, published online quarterly. In addition to the online version, the USACRC releases a weekly RM newsletter highlighting a variety of safety articles, posters and videos, seasonal safety campaigns and USACRC tools and programs.

- **Flightfax** — an aviation safety publication published online monthly. It provides readers a snapshot of Army aviation hazards through analyses of mishaps within the last 30 to 60 days, near-term mishaps, aviation safety issues and historical context via a “blast from the past” feature.

- **Off-Duty Safety Awareness Presentation** — a highly informative safety presentation containing statistics, contributing factors and other relevant information regarding off-duty mishaps. Developed for use at battalion level and below, the presentation comes complete with embedded videos and speaker notes that may be used as is or modified to reflect unit-specific mishap trends.

**CONTENTS**

4 A Tragic Ending  
6 Rollover!  
8 Looking Forward  
10 Weather Happens  
14 Five Questions  
16 Managing the Transitions in Aviation Operations  
18 Territorial Terror  
20 Buying in to Driver Training  
22 Asleep at the Wheel  
24 My Little GSXR  
26 Mishap Briefs
The platoon’s first real combat mission was scheduled to be a nighttime show of force. Equipped with Strykers, they were part of a larger unit and eager to get going to prove what they could do. They would be driving down some narrow, muddy roads. Although a few of the Soldiers had been down the route before, they’d been in the back of a vehicle and didn’t really get a good look. The road was bordered by canals and had an 8-foot drop-off on both sides, making the route very dangerous.

Earlier that day, the Soldiers had reached their equipment and lined up for movement. It was still daylight when they began their mission, driving the route over the muddy roads. Darkness fell just as the platoon reached the most dangerous part of the route. Because the road was barely visible, many Soldiers donned their night vision goggles as they moved.

Suddenly, an urgent message came over the radio—one of the Strykers had gone off the left side of the road, rolled over and landed upside down in the canal. What the platoon didn’t know, however, was that in fact two Strykers more than 200 yards apart had gone off the road and rolled over into the same canal. Both vehicles were sitting upside down on their remotely operated weapons systems, with one side of the vehicle resting against the bank. Nineteen Soldiers were trapped inside the partially submerged Strykers.

Both Strykers began rapidly filling with water, which was soon up to the Soldier’s chins. As they stood inside the troop compartment, the Soldiers were afraid the Strykers might tilt and allow more water to flood in. The squad leader inside the first Stryker yelled for a head count. He thought he heard each Soldier yell back and assumed everyone was accounted for. What he didn’t realize was that he heard a Soldier calling out the name of a missing Soldier as he searched for him. The driver, who also was underwater, was having trouble escaping his compartment. Equipment blocked the passageway to the troop compartment, so he couldn’t escape through that route. Ultimately, he got the driver’s hatch open, swam out of the Stryker and then crawled on top of it. There he was joined by one of the vehicle’s air guards, who’d barely managed to get out his hatch after the vehicle rolled over.

Inside the troop compartment, the second air guard struggled underwater to open the back door. He passed out; possibly not realizing the door, which would have fallen open were the vehicle right side up, now had to be pushed open. The driver and air guard who’d gotten out of the vehicle opened the rear door, allowing the Soldiers inside to escape. They then climbed onto the road, resuscitated the second air guard, and conducted another head count. Finding one Soldier missing, the squad leader went back inside the Stryker to locate him. He found the Soldier lifeless, just a few inches beneath the water’s surface. His load bearing equipment (LBE) had become entangled inside the vehicle, trapping him underwater.

The water was also up to the Soldiers’ chins in the second Stryker. They tried to open the troop compartment door, which was their only way out, but heard someone outside yelling. “There’s a lock on the troop door!” The Soldiers started to panic, so the team leader tried to calm them and asked for a head count. Two Soldiers—the driver and squad leader—were missing. The driver was trapped in his compartment. Equipment in the passageway leading to the troop compartment blocked his escape. The other missing Soldier, the squad leader, was trapped underwater by his LBE. It was almost a half hour before the lock was cut and the Soldiers could escape. By then, the driver and squad leader had both drowned.

The platoon’s first mission ended in tragedy as three Soldiers died without ever engaging the enemy. It was a high price to pay to learn the following lessons:

- Rollover drills are important; however, Soldiers also need to practice exiting their vehicle. The Soldiers who died in these Strykers had survived the rollovers, but couldn’t egress their vehicles. For example, had the crew in the second Stryker practiced exiting their vehicle, someone would have noticed the lock on the troop door.
- Soldiers must follow proper load plans, making sure escape routes and hatches are accessible.
- Leaders must conduct rollover drills and ensure those drills are tailored to the mission. For example, if the route follows canals, Soldiers must know what to do should their vehicle roll over and land upside down in the water.

DID YOU KNOW?

Since FY16, the Army has lost an average of 12 Soldiers a year to Army vehicle mishaps. Leaders must be proactive in risk management during Army vehicle operations.
Perhaps the worst thing a Soldier can hear in a vehicle during training is someone yelling, “Rollover!” What usually follows is a discombobulated few seconds where only gravity and momentum have control of everything left unsecured inside the vehicle — including its occupants.

The Army experienced a significant increase in rollover fatalities in FY19 and in the first quarter of FY20. We lost nine Soldiers in rollover mishaps in FY19 compared to an average of four fatalities during the previous five years. These losses gained senior Army leaders’ interest. The U.S. Army Combat Readiness Center (USACRC) spent significant time studying vehicle mishaps/rollovers and reached some conclusions units can use to prevent these types of incidents going forward. First, though, let’s look at a few numbers:

- In the first quarter of FY20, five Soldiers died in tactical vehicle mishaps.
- In FY19, 13 Soldiers died in tactical vehicle mishaps.
- In FY18, 12 Soldiers died in tactical vehicle mishaps.
- Total Army on-duty vehicle fatalities have not increased; were 24 on-duty ground fatalities in FY19.
- From March 2018 to Sept. 30, 2019, there were no fatal injuries in rollovers attributed to crashing because of a compromise
- Total rollover mishaps have not increased; fatal rollovers have increased. Failure to use restraint systems is a common denominator for fatalities.
- Of the nine rollover fatalities in FY19, two Soldiers did not have restraints available; one was in an M1A2, and the other in the cargo area of an FMTV. Two Soldiers were knowingly operating vehicles with non-operational seat belts. Five Soldiers did not use — and leaders did not enforce — fully operational and available restraints.
- There were no fatal injuries in rollovers attributed to crushing because of a compromise.

Every one of these issues can be addressed by leadership at the company level and below. Most of them are platoon- and squad-level corrections. Why aren’t we doing this? I’ll leave that answer to you.

I don’t mean to lead you to believe that the Army is leaving everything on the backs of junior leaders. The Army is pursuing policy and training updates to decrease ground vehicle mishaps. A short list of some of those efforts include Army Regulation 600-55, Army Driver and Operator Standardization Program (SEP 2019), which directs significant changes in driver and trainer certification and commander involvement. It also requires written and hands-on examinations.

The USACRC has a Lessons Learned webpage where you can review mishaps. We also have an excellent ground guiding video to address the significant number of Soldiers struck by tactical vehicles in FY18, and we recently fielded the Joint Risk Assessment Tool (JRAT) to provide commanders with automated support for their risk management efforts. The Army is pursuing materiel upgrades and retrofits to decrease ground vehicle mishaps. The Joint Light Tactical Vehicle will include cab structural requirements (crush resistance), five-point seat belts, an antilock brake system (ABS), electronic stability control (ESC), an automatic fire extinguishing system (AFES), front and rear driver display cameras, a driver visual enhancement system, and self-adjusting ride height and tire pressure. There will also be upgrades to all new HMMWVs, including improved door mechanisms, upgraded restraints and ABS/ESC retrofit kits. Legacy HMMWVs will be retrofitted with ABS/ESC. Finally, the Army is developing troop kits for cargo vehicles, providing restraints and rollover protection for Soldiers riding in the backs of trucks.

The secretary of defense has stated that our goal for injuries and fatalities in training should be zero. He’s right. Every Soldier death or injury in training is a loss to the unit and a family. We must act at every level of leadership to prevent these needless losses. The last line of defense is the first- and second-line leader. Training and enforcing standards is the very essence of taking care of Soldiers. Let’s get to it. ■
The Army closed fiscal year (FY) 2019 with the fewest manned flight fatalities on record, a reflection of the Aviation Branch’s tenacious approach to safety and commitment to continuous improvement.

Overall, aviation Class A-C mishaps continued a downward trend during FY19, with a nearly 40 percent reduction from FY18. Class A-C flight mishaps (58) and rates (5.54 per 100,000 flying hours) were the lowest in the past 10 years. Due to Armywide emphasis, ground taxi mishaps fell from four Class A’s in FY18 to zero. Most importantly, aviation mishap fatalities decreased from six in FY18 to two. These achievements conclude the safest five-year period in Army Aviation history and place us on a solid foundation as we begin the new decade.

However, we still have work to do. In the first quarter of FY20 alone, the Army experienced four Class A mishaps with five resulting fatalities. This figure exceeds the total number recorded in FY19, and Class A mishaps are on track to surpass each of the past five years. This difficult start to the new year reminds us how quickly our environment can change and the need for continuous, ruthless adherence to risk management protocols at all echelons of our formations.

The U.S. Army Combat Readiness Center remains steadfast in its role of leading Armywide loss prevention efforts and serving as your enduring “backside” support. We continue to disseminate the latest mishap summaries, trend analysis, aviation near miss brief and other safety materials to your safety officers, as well as placing them on our website in near real-time. The graph also shows that flight hours for the fourth quarter remain relatively consistent with the other three quarters, so it is difficult to attribute this trend to increased OPTEMPO during the fourth quarter or end-of-year execution of unit flight hour programs.

The USACRC continues to analyze this problem from multiple perspectives. While fourth quarter mishap data from the past five years does not reveal any appreciable trends, this time period is ripe with risk factors that, when aggregated, present a complex situation increasing the chance for mishaps. We are looking closely at the impact of environmental and training factors, along with the sum of personnel turbulence, usually more pronounced later in the quarter, has a residual safety effect in the fourth quarter. We know from history and our own experience that risk increases significantly during transitions, whether it be the transition between distinct operations and phases or the transition from one leader to another. Seasoned Army leaders understand that establishing relationships and a shared understanding with supporting and supported units decreases confusion, misinformation and mishaps. Thus, we tend to be very deliberate in planning the transitions between commanders, ensuring sufficient time for onboarding briefings, touch points with certain staff functions, and even equipment inventories. But how deliberate are we with aviation safety officer (ASO) transition plans? Some recent feedback from the field indicates a lack of face-to-face handoff and, even worse, no continuity files for incoming ASOs.

Personnel turbulence is nothing new in the Army, so we must anticipate and plan for it. If commanders’ emphasize, receive back-briefs on and make modifications to ASO transition plans, not only will the quality of those hand-offs improve, but will the unit risk profile. As we think about leader transitions, particularly during periods of high personnel turbulence, consider that new leaders in positions of risk acceptance might be initially unable to holistically assess hazards in their new unit, installation or mission role. Limiting their risk acceptance authority the first several weeks as expectations are set and relationships built is one measure to ease the transition. Established ASOs and instructor pilots (IPs) can typically help the commander make good crew mix decisions, but those new to the unit will be unaware of numerous, potentially harmful, factors. In concert with the higher headquarters commander, it makes good sense for senior aviation officers, ASOs and IPs to limit new personnel as mission briefers and/or mission approval authorities for a predetermined onboarding time and for scenario-based mission approval training, as programmed into the unit standing operating procedure. This will allow leaders to train the force on how to identify, assess and mitigate risk and establish standardization of the mission approval process across the breadth of a formation. Finally, new commanders might consider implementing tactical and training imperatives, deliberate mission briefings and rehearsals at their level for a set amount of time to assess and appreciate the level of rigor within existing mission planning and risk management processes.

I hope these recommendations are the start of an engaging dialogue within your formations about how we prepare for success in the fourth quarter. We know the challenge is coming. We have a clear, established trend the past five years. However, the collective critical thinking and sharing of best practices within our community will allow us to reverse this trend. Winning matters! Readiness Through Safety!
or many adults, summer is the time we look forward to taking family vacations. For kids, the season provides a much-needed break from school work. For teenagers, it’s a time to bask in the sun at the beach. For aviators, though, summer is a time when many flight hazards exist. Understanding and preparing for these hazards are the keys to staying safe.

WEATHER HAPPENS

PREPARING FOR SUMMER AVIATION HAZARDS

As we transition into summer, gone are the days of cold fronts and nor’easters. Most of summer’s weather is tied to thunderstorms. Whether you’re talking about the sea breeze, air mass thunderstorms, severe weather or a tropical system, all thunderstorms have certain inherent dangers: severe turbulence, severe icing, low-level wind shear (LLWS), heavy rain, hail and lightning. It even says so right there in Block 22 of Department of Defense (DD) Form 175-1! All thunderstorms have the potential to turn severe with little or no notice. And finally, any thunderstorm can produce a microburst. There are a few other summertime hazards besides thunderstorms, but I’ll address those later.

Types of thunderstorms

There are three types of thunderstorms: single-cell, multicell and supercell. Let’s take a closer look at each type.

Single-cell storms (also known as a pulse storm or air mass thunderstorm) are generally short-lived, lasting only 30-60 minutes, and usually does not produce severe weather. It contains a single updraft. Strong winds and marginally severe hail are possible, but tornadoes are rare.

Multicell storms are a cluster of single-cell storms. New storms tend to form on the rear edge of the cluster, mature cells are in the center, and dissipating storms are along the front edge. New cells can continue to develop every five to 15 minutes. Flash flooding, large hail and tornadoes are the main hazards, but short-lived tornadoes are also possible.

A supercell contains a single, rotating updraft and is usually isolated from the main thunderstorm outbreak — a renegade, if you will. Large hail, severe winds and tornadoes are possible. The lifespan of a supercell can be several hours.

Forecasting thunderstorms

As Air Force meteorologists, we have many tools at our disposal to detect and predict thunderstorms. As you probably guessed, we use the operational weather squadron’s hazard charts. These forecast turbulence, icing and thunderstorms in three-hour increments out to 120 hours. We also look at surface and upper-air analysis as well as the Skew-T Log P diagram. The Skew-T gives us a vertical profile of the atmosphere at a particular location so we can identify the availability of moisture, instability and lift. (Remember those three ingredients?)

Every day is different, as is every thunderstorm. I’ve seen days when I’d have bet the farm on getting severe thunderstorms and received absolutely nothing. I’ve also seen days when I had to amend the mission execution forecast before it was even valid because thunderstorms fired up hours earlier than expected. That’s what makes thunderstorm season so interesting and exciting!

Satellite imagery

Satellite imagery is a great tool for identifying clouds, areas of turbulence and thunderstorms. I’m particularly fond of visible imagery, but it is only available during the daytime hours. With a 1 kilometer resolution image, you can watch the cumulus clouds build, the thunderstorm bubble up, the anvil top blow off and the outflow boundaries form. It’s quite a sight. At night, we use infrared imagery. There are various enhancements that help identify thunderstorms.

Radar

Of all the tools at our disposal, radar is the single most important in monitoring the development and progression of thunderstorms. Using radar imagery, we can track the location and movement of precipitation, identify thunderstorms versus showers, pinpoint any areas of hail or rotation, and interpret whether the storms are building or weakening.

So how does the radar work? Basic radar theory is that the radar shoots a beam at the lowest elevation angle. The returns are bounced back to the radar, where the data is processed into the imagery we all know and love. Once the radar has completed a 360 degree sweep of the lowest elevation angle, it moves on to the next highest elevation angle and so on and so forth. Within minutes, we have a full picture of all slices of the atmosphere. Each individual slice is plotted as a base reflectivity product, and the composite of all slices is plotted on a composite reflectivity product.

Radar imagery can be deceiving. Don’t fall into the trap of seeing red and thinking it means a thunderstorm.
That is not necessarily the case. While red on the radar could mean a thunderstorm, it could also mean large raindrops or a great number of raindrops. The interpretation of red also depends on the product you are viewing. Most forecasters I know use the composite reflectivity as a briefing tool because it gives a nice overview. However, this product is a compilation of all layers in the column, so the presence of red might make you think the situation is worse than it actually is. A scan of the lowest two to three layers of base reflectivity is a better way to check out a storm. Or better yet, ask your local weather experts at the Air Force weather team!

Some other things to watch out for: Beware of a bow! When you see a line of thunderstorms begin to bow outward, that’s an area you want to avoid. A bow echo is usually indicative of damaging straight-line winds.

Outflow boundaries are no picnic either. An outflow boundary marks the dissipating stage of a thunderstorm. That sounds like good news, but it’s not. Across an outflow boundary you’ll notice a wind shift, gusty winds, and cooler, drier air. What does that sound like? A very small-scale cold front, perhaps? Yes, and it is along with other storm cells, things can go downhill fast. When outflow boundaries converge with each other, a line of thunderstorms can form. Thermal turbulence is usually light and confined to the lowest levels of the atmosphere. As you probably guessed, the peak times for thermals to occur is from late morning until late afternoon, when that is when heating is at its max. Mechanical turbulence is caused by horizontal and/or vertical wind shear and can be the result of pressure gradient, orographic effects or frontal zones. Mechanical turbulence is generally found in a thin layer with a width of 10-40 miles and a length much greater than that. Watch out for rotor, lenticular and cap clouds. These clouds are associated with mountain wave turbulence and should always be avoided.

In general, the effects of turbulence for rotary-wing aircraft are amplified with increased airspeed, decreased weight of aircraft, decreased lift velocity and increased arc of the rotor blade. The turbulence intensity depends on aircraft type. The table above shows the turbulence intensities related to different aircraft categories. LLWS: This is a challenge. We can’t tell you which cell will produce a microburst and when that microburst will occur. The science and technology just isn’t there yet, at least not on the military side. We can examine radar data for signs of a storm looking at the echo tops and vertically integrated liquid trends; but by the time we receive the data, it’s already several minutes old. Unfortunately, we usually only find out about a microburst after the fact — when one of our weather sensors reports a gust of 65 knots. That’s not a good feeling!

Air mass thunderstorms are prevalent during the summer months. In and of themselves, they are usually manageable and easy to pick around. However, certain interactions can quickly wreak havoc on aviation. We constantly monitor the radar for outflow boundaries, merging cells, sea breeze and other interactions that tend to ramp up convective activity. Any of these interactions increases the risk of microbursts. Thunderstorm hazards exist up to 20 miles outside of the core of a thunderstorm. The best way to avoid thunderstorm hazards is to steer clear of thunderstorms.

**Other hazards**

We’ve been talking a lot about thunderstorms, but they are not the only game in town during the summer months. Let’s not ignore other summer aviation hazards like turbulence, LLWS and fog.

**Turbulence:** The two main types of turbulence are thermal and mechanical. Thermal turbulence occurs when the surface heat energy increases. Thermal turbulence is usually light and confined to the lowest levels of the atmosphere. As you probably guessed, the peak times for thermals to occur is from late morning until late afternoon, when that is when heating is at its max. Mechanical turbulence is caused by horizontal and/or vertical wind shear and can be the result of pressure gradient, orographic effects or frontal zones. Mechanical turbulence is generally found in a thin layer with a width of 10-40 miles and a length much greater than that. Watch out for rotor, lenticular and cap clouds. These clouds are associated with mountain wave turbulence and should always be avoided.

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“MOST ARMY MISHAPS INVOLVING HUMAN ERROR HAVE AT LEAST ONE OF THESE FIVE ISSUES IN COMMON:”

The majority — 83 percent — of all major accidents involve human error. When human factors are present, we invariably see common indicators that set the conditions for a catastrophic mishap. The deliberate mishap investigation process includes documenting evidence, taking photographs and analyzing data. However, the best source of information for determining what went wrong usually comes from witnesses.

After decades of witness interviews, the USACRC continues to uncover the same mishap causal factors. Five questions we always ask up front often begins to unravel the mystery surrounding the mishap and helps lead the board to findings and recommendations. Most Army mishaps involving human error have at least one of these five issues in common:

1. Was the Soldier trained properly?
2. Was the Soldier supervised?
3. Was the Soldier undisciplined?
4. Was the Soldier overconfident?
5. Was the Soldier complacent?

If you step back and review the timeline leading up to and through the mishap sequence, you will more than likely find that if the leader or Soldier had taken the time to address one or more of these questions, the outcome would have been different. When units get these five questions wrong, the results consistently produce damaged property, loss of equipment and Soldier deaths.

The applicability of these five questions are broad, and the corrective actions are not black and white. How you approach these questions prior to a mishap will always be a challenge for leaders and commanders. It starts with knowing your Soldiers and their behaviors through communication and observation. Planning, executing and documenting training events and qualifications is a step in the right direction. But it’s communication up and down the chain of command and a deliberate face-to-face risk assessment process that truly informs the leader of what questions to ask and what corrective actions need to be taken.

There are no routine missions or repetitive tasks. Treat each task and mission as if it were your first. Follow and enforce the standards and recognize when your capabilities are less than what is being asked of your unit. Failure to take the time to address these five questions during planning and preparation will undoubtedly lead to them being addressed during a USACRC mishap investigation.

If you ever belonged to a unit that experienced a fatal Class A mishap, then you may have seen a team from the U.S. Army Combat Readiness Center (USACRC) arrive to investigate. The USACRC has conducted mishap investigations since 1975, dispatching teams to about 40 fatal Class A incidents annually. The organization does not investigate every Class A mishap. Factors such as complexity of the mishap, public interest and potential for Army-level recommendations help shape whether the USACRC will conduct the investigation. When the decision to investigate is made, the USACRC assembles a board of subject matter experts and follows a deliberate process to determine what happened, why it happened and how to prevent it from happening again.

FIVE QUESTIONS
We've all heard that there's no such thing as a "routine mission" in Army Aviation. Time and again, mishap investigations have proven this to be true. The devil is often in the transitions before and after the primary mission. The paragraphs below detail the most common findings in recent Class A aviation mishap investigations.

Risk-Common Operating Picture (R-COP): While mishap units might have an R-COP on file, investigations show they often failed to identify several key factors that increased mission risk. Missed factors include operational environment (dust/sand/terrain), fighter management and currency in night vision system training. Exclusion of these considerations means the mission briefing officer (MBO) and approval authority miss critical information in determining proper crew selection for mission success. Units should regularly scrub their R-COPs and make sure they cover all factors affecting unit operations, whether for training or in combat conditions.

Aircrew Training Program (ATP): Investigations often find that the unit was inadequately managing its ATP. Left unchecked by leadership, "small" deviations from standard can quickly turn "normalized." Commanders and their standardization staff, including the aviation safety officer, must review their ATPs regularly and monitor the health of the program by conducting no-notice evaluations and commander fly-alongs, sitting in on MBO briefings, and taking a direct role in developing unit training to ensure it meets the standard.

MBO Training: It can be argued that MBO training is the final defense in mishap prevention, but investigations show deficiencies in some training programs. The mission brief is the last opportunity for a risk check prior to the crew's departure, and MBOs must know the right questions to ask and fully understand crew requirements for the specific mission at hand. Commanders at all levels have a stake in designing and validating their MBO training program and should conduct periodic reviews to ensure it remains on target.

Staff Planning: Investigations are revealing the absence of key staff officers (to include the safety officer) in mission planning and a lack of detail in the Deliberate Risk Assessment Worksheet. Ensuring the right emphasis is placed on the planning process allows units to war-game hazards and contingencies and implement controls before mission execution. Leaders must treat the DRAW and R-COP as living, evolving documents, not a paperwork drill, and ensure the correct experts are part of the planning process. Furthermore, through intent and mission command, subordinates must be empowered to make dynamic risk decisions when conditions, environment and missions change to ensure successful mission execution.

Crew Complacency: Complacency is a natural byproduct of all the above — standards deviations, inadequate planning and training, and insufficient risk management. Leaders and aviators alike should routinely self-check to ensure they aren't becoming complacent both in and out of the aircraft. Additionally, complacency can have a dramatic effect on one of the most important aspects of successful mission execution, and that is crew coordination. Everyone must understand the dangers of becoming too comfortable in such a risky profession.

Rehearsals: Just as on the ground side of operations, aviation mishap investigations are increasingly uncovering a lack of pre-mission rehearsals. Rehearsals give crews an opportunity to address hazards before, during and after the principal operation and can help identify small glitches that could lead to a catastrophic event. Standardizing rehearsals prior to each flight gives commanders a prime opportunity to implement controls and drive risk down to acceptable levels. It will also train subordinates and build our professional bench on what "right" looks like.

As you can see, each failure within the system ultimately cascades to the mishap. Implementing controls, following SOPs, maintaining standards, conducting comprehensive training and planning appropriately with the correct personnel (i.e., standardization instructors and aviation safety officers) while standardizing pre-mission rehearsals will go a long way toward safe mission accomplishment.

Readiness Through Safety!

MANAGING THE TRANSITIONS IN AVIATION OPERATIONS
We all know the dangers of snakes — especially those of us who live in the South, where the weather is hospitable nearly year round for the slithering serpent. If you see a snake, usually you won’t have any issues if you just leave it alone. That was not the case in my situation.

A couple years ago, my brother, Ben, and I decided to go fishing at a friend’s family pond. We arrived early to avoid the heat, loaded our gear into a small aluminum jon boat and shoved off into the water. We only had one paddle and Ben had it at the rear of the boat to control our direction around the pond.

We were about an hour into our outing when I saw a water moccasin on the far side of the pond. I pointed it out to Ben and we continued fishing in our area. A few minutes later, I noticed the moccasin again, swimming in a back-and-forth “S” pattern. Ben and I decided we’d just stay away from that portion of the pond and continued fishing for another 15 minutes or so, catching a few bass here and there.

Now comes the good part! I cast my rod and got hung in a tree. I should’ve just cut the line, right? Absolutely not! That was a $12 lure stuck up there. I tugged and pulled to no avail. At the same time, the moccasin resumed its “S” pattern swim about 35 yards away. I continued to tug on my line, trying to get my lure free as the snake swam farther from shore.

I jokingly told Ben that if the snake came in our direction, he’d have to kill it. “I’ll save you, little brother,” Ben replied. Apparently, I had managed to cast my lure into the strongest pine tree branch in the world and it was not coming free. Suddenly, the snake, now about 30 yards away, made a beeline for the front-right side of the boat, where I was seated. I pulled harder on my line, as my flimsy rod was the only thing I had to defend myself from the snake. At 20 yards, I had reached my limit. “You better kill that ‘bleeping’ snake!” Ben told me to calm down.

As the snake drew closer with Michael Phelps-like speed, I remember looking over my shoulder and seeing Ben tying on a rubber worm, not even paying attention. When the scaled beast closed the gap to around 10 yards, it raised its head off the water in an offensive striking posture. Then I noticed something. The two of us, one tall and one large, had managed to press the boat’s buoyancy limits. It was apparent to me that the amount of boat sticking out of the water was less than the height of the snake’s head above water — and it was coming directly at me.

I cannot stress how quickly this snake moved on top of the water. As it crossed past the 5-yard marker, I thought it was just seconds from laying its head down in the boat and striking me until I was dead. In an attempt to save my own life, I began to rock the boat to the left to raise the right side to block the snake’s entry. When the boat was at its lowest point, Ben yelled, “What are you doing?” He then picked up the paddle and struck the moccasin just feet from the edge of the boat. With the threat neutralized, Ben turned to me and asked what I would have done had I turned the boat over and was in the water with the snake. I remember saying a few curse words and something about walking on water like Jesus.

I eventually managed to snap my 14-pound test line and lost my lure.

The lesson I took from this experience was to never let your guard down. We fished this pond multiple times and never saw a snake. Sure, we’d encountered water moccasins on some local lakes, but I’d never seen one as aggressive and bold as this one. As I wrap up my tale of the “Territorial Terror,” I leave you with this: Know the type of wildlife you can reasonably expect to see on your outings and prepare for them as best you can. Never fail to consider the unexpected outcomes — however far-fetched they may be. Oh, and if you were wondering, I eventually managed to snap my 14-pound test line and lost my lure.

According to the Alabama Department of Conservation and Natural Resources, the cottonmouth — also known as a moccasin or water moccasin — is the only venomous aquatic snake in North America. They are found in the southeastern United States and can grow to more than 6 feet in length. Cottonmouths are commonly found in ponds, swamps, streams, springs, marshes and even roadside drainage ditches. The snake’s bite is highly dangerous and can be fatal.

I have seen some snakes that become aggressive as you approach them, but I have never seen a snake charge at a boat fully intending on breaching it. We assume that there was a nest in the corner of the pond where it came from, but again, we were 30-plus yards away. After all was said and done, Ben, a former Marine, told me the snake’s body was so stout that striking it felt like hitting a galvanized telephone pole guyed wire.
Last summer, the Pennsylvania State Safety Office conducted an unofficial investigation into recent vehicle mishaps. The reason for these investigations was due to an increase in vehicle mishaps from the previous year. There were as many accidents in a three-month period in 2019 as there were in six months the year prior. It also seemed the accidents are getting more severe.

What were the reasons for the accidents? I looked into three of the incidents and noticed some trends right from the beginning. The biggest trend was leader engagement — or a lack thereof. When questioning Soldiers from the unit, there was one question that kept repeating in my head: “Where was the leadership?”

In a safety investigation, it is not about finding fault, but trying to prevent incidents like this from happening in the future. The reason I kept thinking about leadership in regard to those accidents is because I also was once a company commander. What would I have done during that rash of accidents? What were the causes of the accidents? Did the commander have too much to focus on during a drill weekend? Was it lack of experience? Was each leader thinking someone else had it handled? I found it was all of these things and some bad decisions.

The main issue was some of the Soldiers operating the vehicles were not licensed. Does that cause an accident? No, but it is a contributing factor. The Soldiers were able to operate the vehicle because they were trained, but not licensed. Leadership started the licensing process but never finished it. Every leader thought someone else had checked or finalized the process. There was no follow up, no accountability.

As leaders, we need to assign a task and verify it is completed. That doesn’t mean we don’t trust our Soldiers. It means we check to make sure it was done and done correctly. In multiple accidents, the leadership was absent or did not verify the tasks were completed. If leaders feel they are overtasked, they need to look at the commander’s intent and prioritize what they can get done and what they will not complete.

In conclusion, the driver training program needs an overhaul. It needs leadership involvement and buy-in rather than just a check in the block. There needs to be supervision throughout the entire process so Soldiers understand how to conduct preventive maintenance checks and services and to operate the vehicle. Only then will we see the mishap arrow turn downward.
Drowsy driving is a major problem in the United States. The risks and often tragic results are alarming. Drowsy driving is the dangerous combination of driving and sleepiness or fatigue. This usually happens when a driver has not slept enough, but it can also happen because of untreated sleep disorders, medications, alcohol consumption or shift work.

No one knows the exact moment when sleep comes over their body. Falling asleep at the wheel is clearly dangerous, but being sleepy affects your ability to drive safely even if you don’t fall asleep. Drowsiness makes you less able to pay attention to the road, slows reaction time if you have to brake or steer suddenly, and affects your ability to make good decisions.

The National Highway Traffic Safety Administration estimates that drowsy driving was responsible for 72,000 crashes, 44,000 injuries and 800 deaths in 2013. However, these numbers are underestimated, and up to 6,000 fatal crashes each year may be caused by drowsy drivers. An estimated 1 in 25 adult drivers (aged 18 or older) report having fallen asleep while driving in the previous 30 days. So who is more likely to drive drowsy?

- Drivers who do not get enough sleep.
- Commercial drivers who operate vehicles such as tow trucks, tractor-trailers and buses.
- Shift workers (who work the night shift or long shifts).
- Drivers with untreated sleep disorders such as sleep apnea, where breathing repeatedly stops and starts.
- Drivers who use medications that make them sleepy.

The warning signs of drowsy driving include yawning or blinking frequently, difficulty remembering the past few miles driven, missing your exit, drifting from your lane and hitting a rumble strip on the side of the road. According to a survey of among nearly 150,000 adults in 19 states and the District of Columbia, 4 percent reported that they had fallen asleep while driving at least once in the previous 30 days. People who snored or usually slept six or fewer hours per day were more likely to report falling asleep while driving.

There are several things drivers can do to prevent drowsy driving, including:

- Get enough sleep! Most adults need at least seven hours of sleep per day, while teens need at least eight hours.
- Develop good sleeping habits, such as sticking to a sleep schedule.
- If you have a sleep disorder or symptoms of a sleep disorder such as snoring or feeling sleepy during the day, talk to your doctor about treatment options.
- Avoid drinking alcohol or taking medications that make you sleepy. Be sure to check the label on any medications or talk to your pharmacist.

A study from Virginia Tech revealed 20 percent of car crashes are caused by fatigue, with young drivers particularly vulnerable.

“A STUDY FROM VIRGINIA TECH REVEALED 20 PERCENT OF CAR CRASHES ARE CAUSED BY FATIGUE, WITH YOUNG DRIVERS PARTICULARLY VULNERABLE.”

As in the civilian world, fatigued driving is also believed to be an underreported causal factor in Army vehicle mishaps. Always take the proper steps to prevent drowsy driving so you don’t find yourself asleep at the wheel.

Sources: Centers for Disease Control and Prevention and EHS Today.
My buddy went straight on Sergeant Major Boulevard and I hung a left onto Airport Road. I gently rolled on the throttle around the long, sweeping corner. As the turn progressed and my ability to see it completely opened up, I spotted sand and gravel that had washed onto the road. My eyes fixated on the hazard as my mind worked to swerve around it. My body tightened and I had a death grip on the bars as I wrenched the bike around. The rear wheel bobbed. I managed to get the bike upright, but then hit the outside curb and was thrown onto the asphalt. I slid and rolled on the ground. My buddy, who had happened to look back, raced toward me, convinced I’d been killed. As I laid in the dirt, I was surprised I survived. It was hours later before I realized just how much I hurt. At that moment, however, the road rash on my arms was the only injury that registered.

A week later, my wife was no longer upset and the insurance company had sent a check for the totaled bike. Since then, I have spent some time thinking about what I might have done differently that day. Of course, I initially blamed the gravel on the road. But this is the real world, not the race track. In the real world, people cross the street in front of you, trucks spill their loads, animals dart across the road and traffic jams stop the flow of vehicles unexpectedly. Also, there is no one sweeping the sand and gravel off the road every day. So what caused my accident?

Complacency

I took that same corner every day for the past two months. I loved it. It was perfectly banked and almost always had no traffic. It begged to be ridden through. But that day was different. I was expecting the turn to be the same even though I could not see the entire road surface all the way around the corner. Luckily, I survived to learn to treat every corner in the real world as though it is the first time I have encountered it. From now on, I will go to the race track for predictable corners I can blindly accelerate through.

Surface changes

Once I spotted the gravel, it took me a moment to comprehend it was a danger. When I was a new rider, I always assumed any change in the road surface could signify a change in traction and pose a threat. Back then, I did not need time to comprehend what the change in surface appearance represented because I treated every change with respect. That split-second advantage may have allowed me to manage the crisis with much more skill rather than just reacting badly.

Skill or reaction?

I used to do track days on my old bike. With good coaching, I developed some great bike skills that translated well to the real world. But after taking a year off from motorcycling and then getting on a new, unfamiliar bike, those skills were not the first thing to rise to the surface in a crisis. I got target fixated on the gravel, stiff on the bike and put a death grip on the bars. Everything I did was driven by instinct. Everything I did was wrong.

On the race track, I learned to stay loose, look where I wanted to go and how to let the bike slide in a turn without crashing. Of course, these things take practice, but I don’t have access to a race track. However, Fort Bliss offers the Motorcycle Safety Foundation’s Military SportBike RiderCourse. This one-day course would have helped polish my rusty skills and given me ways to practice them without access to a race track. Right after I buy my new bike, I will ask my supervisor to schedule me for the next available course.

Personal protective equipment

I wear the gear I am required to wear by the Army. The gloves worked, but, fortunately, I never tested my helmet. My uniform top, however, did nothing to protect me from road rash, and my pants didn’t protect me from the impact with the ground. There are mesh motorcycle jackets and pants with built-in abrasion resistance and padding that may have left me uninjured. This gear can be worn over my uniform. Even in the hottest weather they remain cool while riding. In cold weather, most of these jackets and pants have zip-in liners to keep riders warm, allowing them to extend the riding season far into winter. I plan to buy a jacket along with my new bike.

I learned from my accident. I will treat every corner in the real world as though it is the first time I have ever encountered it. I will treat every change in road surface with respect. I will practice my skills and to seek out training whenever I get a new bike or after a long break from riding. I will wear good motorcycle gear. I hope you will do the same. See you out there. Ride safe!
ON-DUTY FATAL MISHPARS

ACV
- A Second Lieutenant assigned to Fort Benning, Georgia, died 3 February 2020 as a result of injuries sustained in an Army combat vehicle mishap that occurred 22 January 2020 on the installation at 1420 local. The Soldier was serving as tank commander in an M1 tank when the vehicle struck a tree, causing a limb to fall and strike him on the head. The Soldier was transported via air medevac to the local hospital, where he later died.

AMV
- A 21-year-old Private First Class assigned to Fort Irwin, California, died in an Army motor vehicle mishap 9 March 2020 at the National Training Center during daylight hours. The Soldier was driving an M1113 when he struck a winch cable that a Rotational Training Unit had stretched across the roadway to extricate an M978A4 fuel tanker with a Palletized Load System trailer carrying a modular fuel system. He was fatally injured and the truck commander was medically evacuated with non-life-threatening injuries.

PMV-2
- A 29-year-old Corporal assigned to Fort Carson, Colorado, died in a PMV-2 mishap 10 March 2020 in Colorado Springs, Colorado, at 1730 local. The Soldier was reportedly unconscious and unresponsive when evacuated to the nearest troop medical clinic, where he was pronounced dead.

PMV-4
- A 19-year-old Private assigned to Fort Carson, Colorado, died in a PMV-4 mishap 22 February 2020 at 0300 local. The Soldier had attended a party where he was allegedly drinking. Afterward, he lost control of his vehicle, driving off the road and onto a grass knoll. The Soldier’s vehicle flipped three times, during which he was ejected. He was pronounced dead at the scene.

- A 20-year-old Private First Class assigned to Joint Base Lewis-McChord, Washington, died in a PMV-4 mishap 14 February 2020 in Redding, California, at 0117 local. The Soldier was driving his PMV when he was struck from behind by a civilian driver. As the Soldier’s vehicle came to a halt, it was struck again by a semi-truck. The civilian driver who initially struck the Soldier’s vehicle was reportedly intoxicated. The Soldier was pronounced dead at the scene.

- A 23-year-old Specialist assigned to Fort Wainwright, Alaska, died in a PMV-4 mishap 7 February 2020 on Parks Highway, Alaska, at 1540 local. The Soldier was operating his PMV, with two other Soldiers as passengers, when he collided head on with a civilian F-350. All three Soldiers were pronounced dead at the scene. The two passengers were transported to the local hospital for unspecified non-fatal injuries.

- Two Privates assigned to Fort Hood, Texas, died in a PMV-4 mishap 1 December 2020 at 0200 local. One of the Soldiers was operating his PMV when he crossed the median into oncoming traffic and struck another vehicle. The vehicle flipped into a nearby culvert, killing him and the Soldier riding as a passenger. The civilian driver of the other vehicle also died.

- A 25-year-old Specialist assigned to Fort Bragg, North Carolina, died in a PMV-2 mishap 13 January 2020 in Eloy, Arizona, at 2130 local. It was reported that the Soldier may have performed a cutaway. He was found dead during an organized search.

OFF-DUTY FATAL MISHPARS

PMV-4
- A 20-year-old Private First Class assigned to Fort Bragg, North Carolina, died in a PMV-4 mishap 22 February 2020 at 0117 local. The Soldier was reportedly unconscious and unresponsive when evacuated to the nearest troop medical clinic, where he was pronounced dead.

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