



The Safety Corner

From the Marine Corps Center for Lessons Learned
January 8, 2007



Aviation Safety

This issue of the Safety Corner highlights lessons and observations about air operations and several aviation mishaps during operations in the War on Terror.

In this Issue:

[Welcome from the Director](#)

[Aviation Mishaps](#)

['Milk Run'](#)

[Think Safety – Act Safely](#)

From the Director:

Movement by air is a vital mode of transportation between bases in Iraq, as is the use of aircraft in forward operations. Aircraft are used extensively for travel between bases, quick re-supply, MEDEVACS, and various escort and reconnaissance missions. Regardless of the platform or the mission, each has its own hazards.

This issue has a summary of lessons learned the hard way. We have extracted some data from a recent issue of "*Lines in the Sand*", produced by the 3d Marine Aircraft Wing (FWD) Safety Office on Class A/B/C Aviation Mishaps. Furthermore, we have two stories that illustrate the inherent dangers of routine flight missions. The stories show how an unexpected situation can occur through chance or design. Notably, Chris McKenna's story highlights the need to remain faithful to your intuition and training.

Even with about 3,000 CH-46 hours, 350 single engine helicopter hours in Papua New Guinea, and 10,000 commercial jet hours it's always a sickening feeling pulling (increasing) power but continuing to sink or actually getting an increased rate of decent in a helicopter or jet. Drooping turns and realizing power required is greater than power available takes luck and some skill to walk away from whether its due to the loss of an engine, power settling, settling with power, or wind shear.

It is hard to slow down and do the right thing every time and not be pressured or rushed by external or internal factors. It is equally difficult to tell you buddy/squadronmate, "no this does not make sense- let's not do it". Hopefully this newsletter offers some discussion points for a little hanger flying and ready room talk. Those scare and tell stories that start with, "there I was at fifty feet, out of turns, out of speed, and out of ideas" may help you recognize and stay away from a problem or get out of a jam because you have one more idea that you picked up from this newsletter or talking in the ready room.

Check out the Naval Safety Center's Special issue of Aviation 3750 - [Your Partner In The Aircraft and On The Flight Line](#), for more information on Aviation Safety.

I look forward to your comments, observations, and concerns. Send me your scare and tells -we will share them without names or units if you like, I am sure there are a few stories that need to be told about flying around TQ, KV, al Asad, and Camp Fallujah.

Semper Fidelis and fly safe,

Col Monte Dunard, Director MCCLL

Email : monte.dunard@usmc.mil. Telephone: 703.432.1286 DSN: 378-1286

Recent MCCLL Users Survey

The Marine Corps Center for Lessons Learned recently conducted a User's Survey. Over 83% of registered users find the Safety Corner usefully. The safety corner is also read by service members and contractors DOD wide and users out side DOD. We recently received a call from the Inspector General's office at the United States Postal Service for more information on a topic mentioned in the Safety Corner. Email us If you want to be added to the distribution list for the Safety Corner and the Marine Corps Center for Lessons Learned monthly newsletters.

We want to hear what you have to say. We always look forward to your comments and concerns. Let us know what lessons or observations you have that would be helpful to those currently deployed and those who are about to deploy.

The observations and recommendations contained in The Marine Corps Center for Lessons Learned (MCCLL) Safety Corner represent the considered judgment of Marines who have identified safety issues in their units. The purpose of this newsletter is to apprise other Marines of these safety recommendations and to encourage them to enter their own lessons into the Marine Corps Lessons Management System (LMS).



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Aviation Safety Information You Should Not Ignore

By Maj Gary Allison and
Maj B. J. Nownes,
3D MAW (FWD) Aviation Safety

During **November** the 3D MAW(FWD) Commander received 32 Flash Reports:
5 Aviation Ground Incidents
5 Flight Emergency & Precautionary Emergency Landing
9 Things Falling Off Aircraft (TFOA)
3 Take Off or Landing Incidents
1 Near Mid-Air Collision
1 Airfield Incident Report
1 Bird Strike
1 UAV Mishap.

The TFOA reports from multiple airframes reminds us to properly secure all aircraft parts, weapons, ordnance, and Night Vision Goggles. Aircraft panels and aircrew items particularly prone to departing the aircraft should always be secured and checked before flight. Once airborne though, crew served weapons and ordnance must be properly handled to avoid loss.

This chart of aviation mishaps since February 2006 reveals an average of almost one mishap every two weeks. The data speaks for itself. If your unit has not had a mishap out here yet it may be right around the corner, and the data shows that some units are not done with just one.

What are you and your unit doing to buck the trend?

For more information on these mishaps or what you can do to prevent mishaps in your unit. Contact your Safety Officer or the 3d MAW (FWD) Safety Office.

<http://www.acemnf-wiraq.usmc.mil/DOSS/>
Phone: DSN 318-3411-133 or 301
Email: OMB_ACE_Safety@acemnf-wiraq.usmc.mil

Class A-C Mishaps From February 06 - December 06

Date	Squadron	Class	Remarks
02/25/06	VMU-1	B	UAV failure
02/27/06	VMGR-252	C	in-flight hail damage
03/16/06	HMLA-269	B	hard landing
03/17/06	2-224 AVN BN	A	night brownout during desert landing (Army)
03/18/06	VMFA(AW)-533	B	landing gear brake fire
03/25/06	VMA-513	A	night landing on runway repair site
05/24/06	VMU-2	B	UAV failure
05/27/06	HMLA-169	A	impact with water
06/10/06	VMAQ-2	C	right main mount failed to extend for landing
06/17/06	HMLA-169	B	forklift damaged parked aircraft
06/20/06	VMFA(AW)-533	B	engine foreign object damage (FOD)
07/12/06	VMA-513	C	bearing failure caused loss of directional control
07/12/06	VMU-2	B	UAV failure
07/26/06	VMU-2	B	UAV failure
08/03/06	HMH-463	C	tail rotor impacted taxiway during night landing
08/08/06	82nd MED Co.	A	impacted water after night desert LZ T/O (Army)
09/07/06	HMH-463	B	hard landing on unimproved site for troop insert
09/23/06	VMU-1	B	UAV failure
11/06/06	VMU-1	B	UAV failure
11/12/06	HMLA-367	B	main rotor bearing & scissors failure
11/18/06	VMFA(AW)-242	B	single engine fire in flight
12/03/06	HMM-165(REIN)	A	engine failure on take off
12/11/06	HMH-465	A	impacted ground

The following story was submitted by the previous 3d MAW DOSS, Col Robert Hermes. This lesson was provided in support of the lessons from the 'Milk Run' Story later in this issue of the Safety Corner. Col Hermes is a CH-46 pilot

"I saw the ocean pretty close up flying with the Executive Officer once. One of my first times [taking off from] the boat. We were up near the front of the ship. For some reason they launched the aircraft behind us first, I guess he must have been the flight lead. We took off and as a young guy not aware of the effects of rotor wash I pulled up right into his dirty air. We didn't have a lot of power to spare and went below the deck edge to about 10 feet or so above the water. By then ground effect, cleaner air, and some forward airspeed allowed us to regain necessary airspeed and the ability to climb. We never lost that many turns, generators never went off or anything. Could have been an expensive lesson, but it made me a much better pilot and more aware of what it takes to keep a helicopter airborne."



The Safety Corner

From the Marine Corps Center for Lessons Learned January 8, 2007



Milk Run

by Chris McKenna

The Captain of a Navy ship at sea is perhaps the closest thing to an absolute dictator left on Earth. While this is certainly true of most ships, it is not quite the whole truth aboard an aircraft carrier. The Captain rules the ship absolutely, but he leaves the Air Boss to run the flight deck. As a Naval Aviator, I saw the Air Boss as larger than life. He was the voice of authority crackling in my headset, a tyrant with a hair trigger who lashed out at anyone foolhardy enough to disregard him. He used strong language and demanded immediate compliance. He was a man with immense responsibility and an ego to match. And he was addressed by everyone aboard, including the Captain, simply as "Boss."

I flew the CH-46 Sea Knight, a tandem rotor helicopter typically deployed on supply ships within the battle group. It was our job to deliver "beans and bullets" to the fleet. While not actually stationed on the carrier itself, we "hit" it at least every other day, restocking everything needed to keep a small "city at sea" running. It was exciting, challenging flying, requiring great precision and skill, and I loved it. I was in my early twenties and in command of a four-man crew and a multimillion dollar aircraft. But always there, just below the surface, was the aura of the Air Boss. It would lead me to one of the biggest blunders I have ever made in my flying career. But for a matter of a few feet, excellent training, and some dumb luck, it could well have claimed the lives of my crew.

It was a day like most others for a Sea Knight pilot. We launched before dawn on a VERTREP mission, the vertical replenishment of ships at sea that was our specialty. In a synchronized aerial ballet, we flew maneuvers called side-flairs and button-hooks, moving tons of cargo, attached externally to a heavy gauge steel hook beneath the helicopter. Whether it was ammunition, food, machinery, or mail - referred to as "pony" - the ships in the Battle Group depended on us for sustenance. VERTREP allowed the Battle Group to disperse over more than a hundred miles of ocean, and still receive the daily supplies necessary to operate.

By noon we had completed the VERTREP, and only had a load of internal cargo left for the carrier. At ten miles out, I keyed the microphone and called the Air Boss for clearance into his domain.

"Boss, Knightrider zero-six, ten miles out for landing."

"Negative Knightrider, recoveries in progress. Take starboard delta," he mono toned, referring to the holding pattern designated for helicopters.

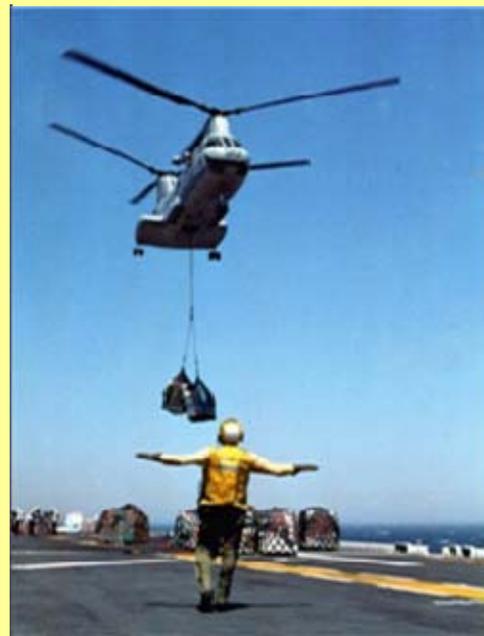
Sometimes I thought he put us there just to show his disdain, as there often seemed to be no reason for it. But today he actually was recovering jets, and we took our Interval in the delta pattern with the carrier's Sea King helicopter already orbiting. I watched as the jets made their approaches and either "trapped" - caught one of the four arresting cables on the flight deck, or "boltered" - missed the wires and went around. As many times as I saw it, I never lost my fascination for carrier operations, and my admiration for those guys. With all the jets aboard, I anxiously awaited our landing clearance. We hadn't eaten since around 3am, and wanted to get back to our ship for chow. But the voice of authority had other plans.

"Knightrider, I've got another cycle fifteen minutes out. I'm going to recover them first Before I bring you aboard," he said matter-of-fact-ly.

"I haven't got the fuel for that Boss," I shot back.

"Then you'll have to bingo," he replied, without a hint of sympathy in his voice.

"That cocky so and so," I thought. I could land, offload, and be airborne again in less than five minutes, and he knew it. But he was the Air Boss and his word was law, so I shut my mouth and turned for home.





The Safety Corner

From the Marine Corps Center for Lessons Learned January 8, 2007



Then I remembered those big orange bags on the cabin floor behind me - the ones with "U. S. Mail" stenciled on them - and realized that they represented my landing clearance. As any sailor knows, "mail-call" ranks just below "liberty-call" in a mariner's heart. Not even the Air Boss could resist the powerful lure of his mail. I keyed the mike, and played my trump card.

"Be advised Boss, we have pony aboard."

I knew that everyone in the tower was staring at him right then, silently willing him to reverse himself. And if he didn't, word would spread like wild fire to each of the six thousand sailors on that ship that he had denied them a mail-call. He couldn't say no.

"Ok Knightrider, you're clear to land, spot three," he spat, specifying the area all the way forward on the angled deck.

He was obviously annoyed, but what did I care? In minutes we would be out of his airspace and on our way back home for chow. I flew a slow, shallow approach, careful not to let my rotor wash disrupt the activity on the flight deck. As soon as I touched down, my aircrew lowered the aft deck and began pushing pallets down the rollers to the waiting forklifts. It was like clockwork. Only minutes after receiving his grudging clearance, we were empty and buttoned up.

"Boss, Knightrider zero six is ready to lift, spot three," I transmitted.

"Hold on Knightrider," he ordered. "I just got a call from supply. They want you to move a load of milk back to home plate for dispersal. How many gallons can we load max?"

It was a question I had never gotten before. I knew we could lift about seven thousand pounds with our current fuel load, but I hadn't a clue how many gallons of milk that equated to. I looked over at Dave, my copilot, and wondered if he had any more insight on the nature of milk than I did.

"Got any idea what a gallon of milk weighs?" I asked.

He just looked at me, shrugged his shoulders, and turned his palms upward in what is commonly referred to as the Ensign's salute.

"Come on Knightrider, I need a number. I've got TACAIR inbound," the voice of authority growled.

I could feel my palms starting to sweat as the forklifts came off the elevators with pallets of milk.

"Come on Knightrider!" he snarled.

I pulled the calculator out of my helmet bag and input 7000. Now I just needed to know what to divide it by. The supply officer usually did all this for us. But here on the carrier I was on my own, and for some reason it was important to me to impress the Air Boss. I was determined to take the biggest load we could.

"Hey Knightrider!" he barked. "I need a number and I need it now. How many gallons?"

"I guess milk weighs about the same as fuel, right Dave?"

He rendered another Ensign's salute.

I knew that jet fuel weighed 6.5 pounds per gallon. We used that figure all the time. Even though that voice in my head told me it was a mistake, I convinced myself that a liquid was a liquid, and milk must weigh about the same as jet fuel. I plugged it into my calculator and, just as the Air Boss started to growl again, closed my eyes and gave him his number.



The Safety Corner

From the Marine Corps Center for Lessons Learned January 8, 2007



"One zero five zero gallons Boss," I transmitted with far more confidence than I actually felt. It was meager comfort that I had actually left a twenty-seven-gallon "cushion," just in case milk was a little heavier than fuel. How much heavier could it be?

"Ok Knightrider. Here it comes. Be ready to go as soon as we button you up," he ordered. "I have Tacair inbound."

The forklifts dropped the pallets on the ramp, and our aircrew pushed them up the rollers and secured them to the deck. In minutes the cabin was filled with enough milk for the entire Battle Group, the ramp was closed, and I was ready to lift.

"Boss, Sabre Seven, five miles out for the break."

"Cleared for the left break Saber Seven. Caution for a Helo lifting spot three. Break, Knightrider you are cleared for immediate takeoff."

That was it. My welcome, as tepid as it was, was officially worn out now that the fighters were on station.

I had hoped to do a thorough power check while hovering in the ground effect cushion of the flight-deck before transitioning over the deck edge.

Ground effect, or the extra lift derived from operating close to the ground, can be a blessing or a curse. Given a long hover run, a pilot could accelerate in ground effect until reaching flying speed, thereby lifting far more weight than would be possible from a standard climbing transition. The carrier however, presented the opposite situation. From our position forward on the angle, I would take off into a ground effect hover, and then transition over the deck edge ninety feet above the water, to an immediate and complete loss of ground effect. It would require tremendous power at max weight . . . every ounce the aircraft had. The little voice inside my head kept telling me about it as I slowly raised the collective to hover, but the big voice in my headset kept drowning him out.

"Come on Knightrider, I need my deck!" he bellowed.

I stabilized in a ten-foot hover and glanced down at the torque gauges to evaluate the power required. Back on my ship, I would have taken thirty or forty seconds in the hover to evaluate a takeoff this critical. But this wasn't my home deck. It was the Air Bosses deck, and he wanted it back.

"I want that damn Helo off my deck Knightrider, and I mean now!" he screamed. So without ever getting a stabilized torque reading, and against all my better judgment, I eased the stick forward and the aircraft lumbered across the deck edge.

As soon as I saw blue water through the chin bubble, I knew we were in trouble. The aircraft immediately settled, and I instinctively countered by raising the collective to add power. But instead of checking the sink rate, the helicopter only settled faster. The steady whirring noise of the rotor blades changed to a distinct "whump, whump, whump," and the familiar peripheral blur slowed to the point where I could clearly see each individual rotor blade. A quick glance at the gauges confirmed that both engines were working normally. I was simply demanding more power than they could produce, and the rotor speed was decaying under the strain.

I should have predicted what would happen next. With a perceptible jolt, both electrical generators "kicked" off. Powered by the rotor system itself, they had been designed to "shed" at 88% of optimum rotor speed. Thankfully it was daylight, so lighting wasn't an issue, but the jolt I felt was the loss of the flight control stability system. The helicopter was still controllable, but it was far more work without the stab system. Things were starting to go very badly.

As the rotor speed continued to audibly and visibly decay, I realized the only chance we had was to somehow get back into ground effect. If I continued to "wallow" like this, the helicopter would eventually "run out of turns" and crash, or simply settle into the ocean and sink.





The Safety Corner

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Neither of those appealed to me, so I determined to try a maneuver the "Old Salts" called "scooping it out."

Any pilot will understand when I say it is counterintuitive, when faced with an undesirable sink rate, to decrease either power or pitch. But "scooping it out" required both. In order to dive back into ground effect, I lowered the nose and the windscreen filled with the sight of blue water and white foam. To preserve some of the rapidly deteriorating rotor speed, I lowered the Collective and descended. The ocean rose fast. Remembering my crewmen, I managed to blurt out "Brace for impact!" over the intercom. Dave immediately sensed what I was attempting, and began a running commentary of altitudes and rotor speeds.

"Fifteen feet, 84% ."

I needed forward airspeed and knew I had to trade some more altitude to get it, so I eased the stick forward a little more.

"Five feet, 85% ."

I stopped descending and stabilized in the ground effect run.

"Three feet, 85%."

"Ok," I thought. "We're not settling anymore, and the rotor speed has at least stopped decaying." But I couldn't seem to coax any acceleration out of it, and this close to the water, even a rogue wave could bring us down. That's when I decided that I really hated milk.



"Three feet, 86 %."

With just the pitiful speed I had brought from the dive, and no sign of any acceleration, I began to despair. What else could I do? I thought about asking Dave, but didn't think I could bear another Ensign's salute. Then I remembered those Old Salts in the ready room again.

"Remember, this aircraft has no tail rotor. If you ever need just a little something extra, try a fifteen-degree right yaw. The increase in drag is negligible, but it feeds undisturbed air to your aft rotors."

Well, what did I have to lose at this point? I gently pushed on the right pedal and the helicopter yawed. Again, it seemed counterintuitive. If I was trying to accelerate, shouldn't I streamline the aircraft? But I was out of options.

"Two feet, 85%."

I began running through the ditching procedures in my mind. But then I noticed that the waves were gliding by slightly faster than they had been only seconds before. Slowly, almost imperceptibly, we were accelerating.

"Three feet, 88%."

I glanced down at the airspeed indicator and my heart leaped; it had moved off the peg and was passing through forty knots. The next thing I felt was that beautiful shudder every helicopter pilot knows as translational lift - the point where the aircraft is flying more like an airplane than hovering like a helicopter.

"Five feet, 92%."



The Safety Corner

From the Marine Corps Center for Lessons Learned January 8, 2007



Then I felt another jolt, and knew the generators had come back on the line, bringing the stab system with them. We were a fully functioning aircraft again. I accelerated through our normal climb speed, remembering those Old Salts once again.

"Speed is life."

"Ten feet, 100%.

" At ninety knots and all our turns back, I finally felt confident enough to climb. Passing through one hundred feet, and over a mile from the carrier, the voice of authority spoke.

"It's great to see you flying again Knightrider. We were all holding our breath up here. I hope I didn't talk you into doing something ugly."

Well what do you know. The guy was human after all. Who knew? Turning for home, I passed the controls to Dave, and sat back. For the first time, I took a deep breath and noticed that my hands were shaking. I had made a rookie mistake, and very nearly paid for it with four lives and a helicopter. I had allowed myself to be intimidated by the Air Boss, and sacrificed my judgment as a result.

I did some checking the next day, and found that the weight of a gallon of milk is 8.7 pounds, a far cry from the 6.5 I had estimated. So even with my little "pad," we took off from that carrier more than 2,100 pounds overweight. And that doesn't even consider the weight of the pallets and packaging. All in all, I was very lucky to get away with it.

That was almost twenty years ago, and I guess I'm the Old Salt now. I've accumulated thousands of flight hours and more than a few gray hairs since then, but I try never to forget the lessons I learned that day.

Besides a life-long loathing for milk, I came away from that episode with two rules.

First, never allow external pressures to force a rush to judgment on any matter of safety. There's simply too much at stake. If I ever feel rushed, I make a conscious effort to step back, slow down, and think the matter through.

And second, I never, ever ignore that voice in my head when he tells me something just isn't right. I've learned over the years that he is frequently the only one in the conversation making any sense.

Oh yeah, and when the guy at the supermarket asks me if I want my milk in a bag, I always ask him if he would mind double bagging it for me - just in case.



Think Safety - Act Safely

Thinking about safety is a good idea.

However, acting Safely is what really helps to save lives.

An action is more than just putting on a t-shirt. It involves doing what is right, regardless of what is popular. Leading by example is a good way to enforce the importance of safety.

Think about the dangers before you perform any task and use the right safety equipment to keep yourself and others safe.

A little common sense can go along way to prevent you from learning a lesson the hard way.

Think Safety – Act Safely – Wear a Helmet!