Flightfax

ARMY AVIATION RISK-MANAGEMENT INFORMATION

JULY 2003 ✦ VOL 31 ✦ NO 7

a new look at an old problem...

Dynamic Rollover

PLUS: SMA Jack Tilley sends... "Get On-Target With Your Weapons Training!"

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U.S. ARMY SAFETY CENTER

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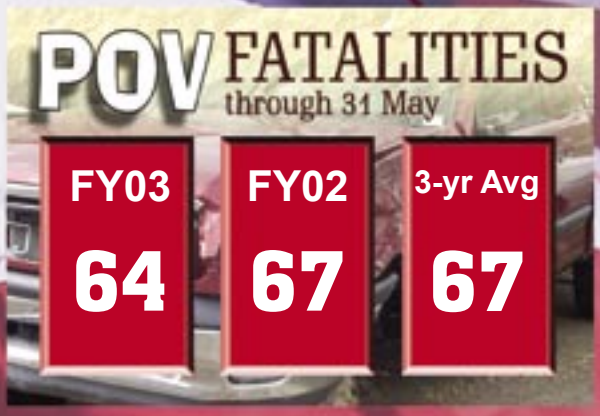

Flightfax is published by the U.S. Army Safety Center, Building 4905, Fifth Avenue, Fort Rucker, Alabama 36362-5363. Questions about the editorial issues addressed in *Flightfax* should be directed to the editor at DSN 558-9855, commercial telephone (334) 255-9855 or flightfax@safetycenter.army.mil. Distribution questions should be directed to Media and Marketing at DSN 558-2062, commercial telephone (334) 255-2062.

Joseph A. Smith
COL(P), USA
Commanding

DASAF's Corner

FROM THE DIRECTOR OF ARMY SAFETY

I'm Excited to Join Your Team!

BG Jim Simmons has done a truly remarkable job over the past two years as the Director of Army Safety (DASAF). He has helped chart the right strategic course for Army safety and has already transformed the multifunctional Army Safety Center into an organization that daily addresses risk management and safety issues from platoon level to Department of the Army level. BG Simmons' forward thinking has set a new standard in managing safety throughout the Army.

As your new DASAF, I will do my very best to continue to steer the course outlined in the Army Safety Strategic Plan and ensure that Army safety and risk management are embedded fully into our interim and objective forces. More importantly, I am committed to helping each of you as we protect the force today and preserve our combat power for tomorrow.

The Army holds us, as commanders, **responsible** and **accountable** for the safety of our soldiers. This is an awesome responsibility. It's one that often prevents sleep in the early morning hours and triggers a mental review of the mission risk assessment just prior to a training event, a major exercise, or imminent enemy contact. It is a responsibility that no commander can, or does, take lightly.

Statistics clearly prove that commanders who use all the tools available to identify hazards and mitigate risks have the biggest impact on their units. The chain of command who ruthlessly enforces standards and discipline while using unit safety personnel and those within the Army safety community will continue to make the difference. The Safety Center stands ready to assist. Give us a call!

Having just returned from deployments in both Afghanistan and Iraq, I personally saw commanders aggressively applying risk management with tremendous results; however, there is still work to be done. Thanks to the quick dissemination of information from our accident investigations, many of the safety lessons learned from both ground and aviation operations are already available, and we're taking a hard look at them. For example, we have had a number of negligent discharges of weapons. This clearly indicates that we need to better address this issue in our ground accident prevention programs. We'll look at ways to address this problem, possibly having soldiers perform more training with magazines in their weapons to ensure they know proper clearing procedures.

I truly appreciate the opportunity to serve in the United States Army. I am particularly excited to join the team of dedicated professionals who every day diligently seek ways to make the Army a safer place for our soldiers to live and work.

This month as we celebrate our Nation's independence, let us not forget to reflect on the service and sacrifices of those who secured our freedom. Let us be especially grateful to all those who today willingly serve to maintain our free way of life. Have a **safe** and happy Independence Day!

Joe Smith

COL(P) Joseph A. Smith

a new look at an old problem...

Dynamic Rollover

We usually think of dynamic rollover as something to be avoided during slope operations. FM 1-203: *Fundamentals of Flight* addresses dynamic rollover in the section on "Slope Operations"; aircrew training manuals include a note in the maneuver description that the aviator must understand dynamic rollover before conducting slope operations; and dash 10's include a slope-landing limit intended to minimize the chances of dynamic rollover.

Then why do we continue to average one Class A or B accident involving dynamic rollover each year? The answer is that dynamic rollover accidents are happening on flat

ground. In fact, since Fiscal Year (FY) 1992, 75 percent (9) of dynamic rollover accidents have occurred on level ground. The attention we've given to preventing dynamic rollover during slope operations has paid off; rollover during slope landings and takeoffs is now rare. If we understand dynamic rollover and take the same precautions when operating on flat ground as we do when operating on slopes, we should be able to significantly reduce these accidents.

Definition

Dynamic rollover is the occurrence of a rolling motion; while any part of the landing gear is acting as a pivot, which causes the aircraft to exceed a critical angle and roll over. Dynamic rollover is caused by the main rotor thrust. Untrimmed lateral main rotor thrust causes the roll rates that make the aircraft exceed its critical rollover angle. Other physical factors that contribute to dynamic rollover are center of gravity, tail rotor thrust, crosswinds, ground surface, slopes, and main rotor design.

Main rotor thrust

Main rotor thrust is laterally trimmed when it is acting more or less vertically. When hovering, a helicopter is laterally trimmed when ground movement is zero. If the helicopter has a pivot point in contact with the ground and the main rotor thrust is not laterally trimmed, the sideward component of that thrust will roll the helicopter around the pivot. The roll rate depends on the cyclic input from the trimmed position and on the amount and rate of collective input. If the roll rate is high, the aircraft can rapidly reach its critical rollover angle.

Pilots can do two important things to avoid dynamic rollover. First, they must ensure that the cyclic is positioned to keep main rotor thrust laterally trimmed when touching down or lifting off to a hover. Secondly, they should stay alert to changes in aircraft attitude.

When touching down, pilots should adjust the cyclic only as necessary to maintain lateral trim and ensure a vertical descent until the entire aircraft weight is on the landing gear. In most helicopters, once the collective is fully down, the cyclic should be placed in the neutral or central position. In the AH-64 and UH-60, cyclic adjustment is coordinated with collective reduction.

When lifting off, first position the cyclic to ensure that main rotor thrust is vertical. As a guide, the main rotor tip path plane should be parallel to the horizon. As collective is increased and the helicopter becomes light on the gear, adjust the cyclic to compensate for winds, aircraft loading, and translating tendency. To ensure a vertical ascent, make further adjustments as each wheel or skid leaves the ground.

The pilot on the controls must always be alert to the cyclic position and all control movements must be smooth and coordinated. Maintain lateral trim with the cyclic and do not apply excess cyclic to pin a wheel or skid to the ground during landing or takeoff. When landing, fly the aircraft until the entire aircraft weight is on the gear. When taking off, start flying the aircraft before raising the collective. To avoid dynamic rollover, these landing and takeoff techniques must be employed regardless of whether the aircraft is on flat or sloping ground.

Center of gravity

The critical rollover angle changes as the location of the center of gravity (CG) changes. Helicopters generally have different CGs and, therefore, different critical angles in different configurations. The CG and angle change as fuel and ammunition are used. Asymmetric loading will also change the critical angle and make the aircraft more likely to roll toward the heavier side.

Be conscious of the changes in CG that occur during the mission, and avoid asymmetric loading. When landing or taking off, think about the effect of the aircraft's CG *before* beginning the maneuver.

Tail rotor thrust

In single-main-rotor helicopters, tail rotor thrust can contribute to high roll rates. Because tail

rotor thrust acts to the right, the tail rotor tends to roll the aircraft in that direction, especially when the right skid, wheel, or float is acting as a pivot.

Since FY92, 75 percent of dynamic rollover accidents have involved rollover to the right. Many of these accidents might have been avoided if the pilot on the controls had adjusted the cyclic to compensate for tail rotor thrust (translating tendency), especially while lifting off to a hover. Care must be taken when applying pedal inputs to ensure they are smooth. Adjust lateral trim with the cyclic whenever tail rotor thrust is changed by pedal inputs. When increasing the collective, apply left pedal. As thrust is increased, adjust the cyclic to the left to compensate for the increasing tail rotor thrust to the right.

Crosswinds

Crosswinds acting on the fuselage can help roll a helicopter over. Avoid lifting off or touching down with crosswinds. If there is a crosswind, make the proper cyclic adjustment into the wind to keep the aircraft laterally trimmed. Crosswinds also necessitate tail rotor pedal inputs to maintain directional control. Again, these tail rotor thrust changes must be trimmed by cyclic inputs as necessary.

Ground surface

Rough ground or obstructions that pin a wheel or skid to the ground can contribute to dynamic rollover. Several rollover accidents have been caused by hitting an obstruction with the landing gear or by attempting a takeoff with an obstruction next to the gear. Accidents have also occurred when the aircraft was allowed to slide laterally across the ground. This can cause fuselage roll rates to develop, leading to dynamic rollover.

When operating close to the ground, watch for obstructions and carefully select a landing point. If you inadvertently land with the skid or wheel against an obstruction, it would be safer to shut the helicopter down and have it towed away or remove the obstruction than to attempt a takeoff. It shouldn't be necessary to mention the need for a proper preflight inspection.

Slopes

When landing or taking off from a slope, a helicopter will roll over if the maneuver is continued after the cyclic control limits are reached. Once a limit is reached, correct lateral cyclic trim cannot be maintained. Observe caution when operating on any slope, and take particular care to avoid slopes greater than the aircraft's slope limitation.

Main rotor design

If you're an AH-64, UH-60, OH-58D, or CH-47 pilot, you already realize how sensitive these aircraft are to lateral cyclic inputs. These aircraft have good control authority; that is, they respond rapidly to cyclic inputs. Hence, they are quick to develop roll rates, but the cyclic is also very effective in stopping that roll rate once it is detected.

Teetering-head helicopters—the OH-58A/Cs, UH-1s, and AH-1s—are slow to develop a roll rate, but the control authority is so poor that cyclic inputs alone are unlikely to prevent a rollover once a roll rate has developed. This characteristic is reflected in the accident data for the past decade. Fifty percent of dynamic rollover accidents have involved teetering-head helicopters.

While the aviator has no control over the design of the aircraft's rotor, he does need to be aware of its characteristics. In a teetering-head helicopter, collective reduction is most effective at stopping a high roll rate. In other helicopters, cyclic input also has a rapid effect. Regardless of the design, actions needed to correct a roll rate are the same and should be instinctive: simultaneously reduce the collective, and adjust the cyclic to maintain lateral trim.

Other factors

Physical factors—main rotor thrust, center of gravity, tail rotor thrust, crosswinds, ground surface, slopes, and main rotor design—cause dynamic rollover. However, it is important to understand that the pilot can prevent dynamic

rollover by avoiding the physical factors that cause it. Unfortunately, the pilot usually fails to avoid these physical factors because of human factors.

■ **Inattention**. If the pilot on the controls is inattentive to the aircraft's position over the ground or its attitude while lifting off or touching down, he risks dynamic rollover. Use extra care when operating close to the ground.

■ **Inexperience**. Over forty percent of dynamic rollover accidents have occurred with low-time pilots on the controls. If you are the pilot-in-command, you are always responsible for your aircraft. Guard the controls and monitor the pilot on the controls.

■ **Failure to take timely action**. The time to take action is *before* a roll rate develops. Remember that by the time you notice that a roll rate has developed, a rollover may be inevitable, especially in a teetering-head helicopter. When you detect a roll rate developing, simultaneously reduce the collective and adjust the cyclic to maintain lateral trim.

■ **Inappropriate control inputs**. Applying inappropriate control inputs is the root cause of almost all dynamic rollovers. If the pilot pays adequate attention to applying control inputs smoothly and carefully, dynamic rollover accidents are avoidable.

■ **Loss of visual reference**. If you lose visual reference while operating close to the ground, take off or execute a go-around, using instrument techniques if necessary. A less desirable option is to continue forward to the ground. If the aircraft contacts the ground while drifting sideward, rollover can occur.

Dynamic rollover is avoidable

Dynamic rollover can be avoided by paying attention to contributing factors, both physical and human. Trim the aircraft with the cyclic during landing and takeoff and remain alert to the aircraft's attitude. Above all, *FLY THE AIRCRAFT*: when landing, until the entire aircraft weight is on the landing gear; when taking off, before any collective is applied. And remain alert to the cyclic position and maintain lateral aircraft trim with the cyclic at all times, regardless of whether the aircraft is on flat or sloping ground.

Editor's note: This article is an 'oldie but goodie' and a favorite for many aviators. This was first published in Flightfax in 1991 and is still being used today (some have copied it so many times that it is hardly legible). Since we have had so many requests for copies, we decided to update the statistics. If you have other favorites that need to be updated, call us and let us know. ♦

Assessing Mission Risks Versus Just Checking the Block

MAJ David Schoolcraft
U.S. Army Safety Center

The commander has just appointed you as the aviation mission briefer for all low-risk missions. What are your duties as a briefing officer? Certainly they are more than approving and signing the risk management worksheet (RMW) prepared by the crew. So then, what exactly are your duties?

Let's start with the basics. Army regulation (AR) 95-1, 2-14b, states that briefing officers are responsible for ensuring that key mission elements are evaluated and briefed to the mission pilot-in-command (PC).

What should the mission briefer consider as he evaluates the mission using the unit's RMW? The mission briefer should be evaluating, at a minimum, those key elements identified in AR 95-1, 2-14b (1)-(7). Unfortunately, the RMW is not a cure-all to the risk management solution. The mission briefer still must take into consideration all information concerning the mission, environment, and crew, as well as all the hazards inherent in aviation operations.

Ideally, the mission briefer is an experienced aviator who has a personal aviation knowledge base to draw upon. If he doesn't have that experience, the mission briefer should know which questions to ask to make informed decisions and to implement any needed controls for the crew to safely accomplish the mission.

Risk management is not just filling out and signing the RMW. As outlined in Field Manual (FM) 100-14, it is a five-step process that includes *identifying hazards*, *assessing hazards* to determine risks, *developing controls and making risk decisions*, *implementing controls*, and finally *supervising* to ensure that the controls identified are being used and are working with the desired results. After the RMW is signed, the mission briefer must back-brief the modified mission to the PC to ensure he understands what he is approved to do.

The experience of those of us here in the Aviation Systems and Accident Investigation Division at the Army Safety Center has been that most units do an adequate job of identifying and assessing mission risks (steps one and two). Unfortunately, the five-step risk management process ends when the RMW values fall within the mission briefer's authority and he signs the worksheet. After that, little is done on steps three through five of the risk management process to mitigate or eliminate risk.

Low-risk missions cannot be taken for granted or written off as a routine event. There are plenty of things that can go wrong. Mitigating risks to their lowest level is not only prudent, but also necessary when the situation and mission permit. Where will your unit's next accident be? Will it occur on a very complex collective training event in which an operation order (OPORD) has been published and rehearsals and rock drills have been completed? Or will it occur on a typical, routine low-risk aircrew training manual (ATM) flight in the local area?

Mission briefers must not fall into the trap of just "checking the block" so a crew can conduct a low-risk training mission. We must identify and assess the risks on *all* missions and then make decisions at the appropriate level and implement controls so the mission can be completed safely. Commanders must ensure their approved aviation mission briefing officers are trained to perform these duties, which include a thorough understanding of risk management. ♦

—MAJ David Schoolcraft works in the Aviation Systems and Accident Investigation Division, U.S. Army Safety Center, DSN 558-9858 (334-255-9858), david.schoolcraft@safetycenter.army.mil

NCO CORNER

Get "On-Target" With Your Weapons Training

SMA JACK L. TILLEY

Recent Army accidents have revealed a disturbing trend: our soldiers are being killed and injured by improper weapons handling. These accidents occur for a variety of reasons including insufficient training, ineffective supervision, negligence, inattentiveness, or outright indiscipline. This must come to an end—now! One hurt soldier is one too many.

All soldiers, regardless of their MOS, must be proficient with their assigned weapon. Operation Iraqi Freedom clearly demonstrated that *any* unit might have to engage the enemy. Weapons proficiency is a cumulative and degradable skill that must be instilled into each soldier and constantly maintained.

We train as we fight and we fight as we train. Soldiers in combat areas wear body armor; why not have them wear it when qualifying and training with their weapons? Training must reflect battlefield conditions as closely as can be safely done. Hard, realistic training is critical to success in future operations. Anything less is a disservice to our soldiers.

Muzzle control, selector switch operation, and fire discipline are critical to weapons safety and can't be taught solely in the classroom environment. They must be incorporated into your regular training, and you must always enforce the standard. Soldiers should become so comfortable with their weapon that its safe and proper use is second nature. The selector switch stays on SAFE and the soldier's finger stays off the trigger unless engaging targets or when enemy contact is imminent. A well-trained soldier can follow these safety procedures and still rapidly and accurately engage the enemy. Whenever you see a safety violation, correct it. A moment's inattention can lead to disaster.

Annual range qualification doesn't necessarily indicate weapons proficiency. Soldiers not only must effectively engage targets, they must also perform other associated tasks including:

- **Clearing procedures**
- **Loading and unloading procedures**
- **Immediate action**
- **Remedial action**
- **Disassembly and reassembly**
- **Weapons maintenance**
- **Functions check**
- **Preventative maintenance checks and services**

Can your soldiers perform these tasks to time and standard? If they can't, they're not properly prepared.

While the basic operating principles remain the same for many small arms, there can be significant differences that can put the untrained soldier at risk. Does your M249 Squad Automatic Weapon gunner understand how an open-bolt weapon operates? How about the rest of your soldiers? Soldiers unfamiliar with open-bolt weapons have had accidental discharges while attempting to chamber a round. When cross-training your soldiers, make sure they become proficient with all of your unit's weapons. Circumstances might require a rifleman to become a machine gunner in a hurry. Would that rifleman be ready? Would you be ready?

Weapons proficiency is the province of the NCO. From the youngest corporal to the Sergeant Major of the Army, we are the primary trainers and guardians of the standard, and competence is our watchword. We must take ownership and make it happen. If we don't, then who will? Our young soldiers depend on us for our experience and our expertise. The soldiers we train today will become the Army leadership of tomorrow. We must arm them with the tools, techniques, and procedures to prepare them for that task.

You have proven yourselves as the most professional NCO Corps in the world, a force that stands ready to fight and win on the modern battlefield. Now I challenge you to continue that tradition of excellence. Train our soldiers well, train them to standard, and keep them safe. ♦

WAR Stories

Risk management lessons learned

Get-Home-Itis!

Bob McGaffin
CP-12 Intern

I was an aircrewman on a military transport aircraft that was bringing home a contingent of sailors and cargo after a 6-month deployment. We departed a Naval Air Station on the West Coast at 0800L with an empty aircraft, except for the normal Space A passengers hitching a free ride.

After refueling mid-country, we arrived at the East Coast debarkation port mid-afternoon. Joining the line of other transport aircraft awaiting loads of personnel and cargo, it was up to our loadmaster to expedite the loading process. We knew that returning to our home duty station that day would place us very close to our crew duty limit of 18 hours.

After sorting out our share of the carrier air group and their cargo baggage, we departed for the long flight home. Spirits among the passengers were high, as might be expected after 6 months of separation from loved ones. Refueling was once again accomplished mid-country uneventfully and the final flight leg commenced.

Due to the weather conditions commonly encountered on the West Coast during the summer months and the vicinity of relatively cold bodies of water, areas of dense ground fog can form unexpectedly. The condition can occur at any time of the day or night, remain for several hours, and then dissipate.

After 16 hours of crew duty, the cockpit and cabin crew were starting to feel the effects of fatigue and were looking forward to the end of the flight. Bringing home sailors after deployment is considered one of the finer points of duty. Nothing is more inspiring than enabling family reunions. With families waiting, the crew was determined to do everything within reason to ensure that the flight arrived on time.

Approximately 30 minutes before the scheduled landing, the cockpit crew was advised by approach control that fog was starting to form on the airfield. This was not the kind of fog that most people observe—but a layer 35 feet deep! Since the field was technically above minimums and the alternate was only 30 minutes away, a visual approach was attempted. Wouldn't you know that the only runway with centerline lighting was not available?

A flyover of the field noted that the streetlight cones, tops of structures, and outlines of streets were visible, but partially obscured. On final approach with the aircraft fully configured for landing and checklist complete, we began the flair at 50 feet and reduced power. Upon entering the fog layer, the landing light reflection turned the outside view into a virtual whiteout. Visual reference with the left runway border lighting was lost and the aircraft drifted right. As the right set of border lights drifted under the aircraft, the landing was aborted and maximum power applied.

The pilot realized that the

aircraft had drifted right, so he side-slipped the aircraft to the left. During the correction, the main landing gear touched down momentarily before the engines achieved maximum thrust and the aircraft lifted from the ground. The cockpit crew sensed that, in all probability, at least one of the main gear wheels had touched down on tarmac rather than the runway since the left-edge lighting had not been reacquired before touchdown. The landing gear was left extended, in case of damage, and the flight proceeded to the alternate destination where an uneventful landing was performed.

Post-landing inspection revealed mud and moss imprints on both right main landing gear wheels and moss on the right flap assembly directly behind the wheels. The runway at home base was found to be covered with gravel and dirt, caused by the thrust of the engines going to maximum power and high angle of attack during rotation. Wheel imprints were found 4 feet from the right runway edge and 200 feet from the approach end of the emergency arresting gear motor.

Under different circumstances, would the crew have attempted this landing? Probably not. Fatigue, marginal weather, and poor lighting, combined with the desire to complete the mission stacked the deck and nearly caused a disaster. This story has a happy ending, as 14 hours later the passengers and crew were reunited with their loved ones.

Despite the fact that crew duty days have been shortened and that the aforementioned runway now has centerline lighting, attempting that landing would still be a poor decision today. The sad fact is that someday, under different circumstances, 'GET-HOME-ITIS' will strike again. Don't let it affect you! ♦

—Bob McGaffin is a recent graduate of the U.S. Army Safety Center CP-12 Occupational Safety and Health Course here at Fort Rucker, AL. He is currently assigned to HQ, 2nd Brigade, APO AE 09226; e-mail: bob.mcgaffin@us.army.mil.

Bob is a retired Navy Chief Petty Officer with over 21 years of naval aircrew experience in five different types of aircraft.

Editor's note:
While Bob McGaffin's story is about his experience in a Navy aircraft, the same decision-making problems occur with all aviators in all aircraft. The photo depicted here is an Army accident that happened a few years ago with much the same Get-Home-Itis-type decision making. This crew wasn't so lucky; the aircraft was destroyed and *two of the four* crewmembers were fatally injured.

Improper Hardware Installed on OH-58A/C

Recent Directorate of Evaluation and Standardization (DES) visits have found several OH-58A/C aircraft with incorrect bolts installed on the tail rotor trunnion bearing caps. Many times, maintenance personnel install weights under these bolts {IAW TM 55-1520-228-23-1, para 5-238} to adjust for static chord wise balance. The problem arises when bolts that are too short are used and there is not at least 0.250-inch thread engagement as required by the maintenance manual.

TM 55-1520-228-23 para 5-238 b (2) and (3) states: Remove bolts (11) from housing (9) and yoke (1) of tail rotor hub and install weight and/or washer combinations under bolt heads until chord wise balance is achieved.

NOTE: Ensure at least one washer (12) remains under the head of each bolt (11) after balancing is achieved.

Use NAS 1304-2H through NAS 1304-8H bolts (11) as required to secure weight and/or washer combinations. Ensure a minimum of 0.250-inch thread engagement of bolt.

Apparently some confusion exists about the use of a washer under the bolt if a weight is being used. Paragraph 2 says "weight and/or washer combination." This does not mean a washer is not required if a weight is being used. The combination of the two is for balance purpose only, a washer is mandatory at all times under the bolt IAW the NOTE.

Part of the problem stems from the insert being recessed in the yoke approximately 0.125 inch. This depth is not taken into consideration when selecting the proper length bolt; see figure 5-74, item 14, on next page. To ensure at least 0.250-inch bolt thread engagement, only one washer can be used with an NAS 1304-2H or -2 bolt. Each bolt dash (-) number represents an additional 1/16-inch grip length. When additional weights are required, use the following guideline to ensure the proper bolts are installed. The dash (-) number is stamped on the head of each bolt.

- **NAS 1304-2H or -2 bolt:** No more than one washer installed under bolt head (one must be a washer).
- **NAS 1304-3H or -3 bolt:** No more than a combination of one weight and a washer (one must be a washer).
- **NAS 1304-4H or -4 bolt:** Combination of three weights and a washer (one must be a washer).
- **NAS 1304-5H or -5 bolt:** Combination of four weights and a washer (one must be a washer).

Now, here is another twist. In the maintenance manual, TM 55-1520-228-23-1, para 5-238 b(3), the bolt part numbers referred to as NAS 1304-2H through NAS 1304-8H have been changed. When you go to the parts manual, TM 55-1520-228-23P, figure 60, item 22A, the required bolt part numbers are NAS 6604H2 through NAS 6604H8. The 6604 part numbers are the replacements for the 1304 part numbers.

Longer bolts may be used provided they don't bottom out in the yoke. A bolt that is too long will contact the bottom of the yoke and prevent the trunnion cap from being tightened to the proper torque of 30 to 40-inch pounds, IAW para 5-238c(4). ♦

—POCs are CW4 Carl McFarland, DES, NGB Western Area Aviation Training Center (WAATS), DSN 853-5514 (520-616-5514), e-mail: mcfarlandc@az.ngb.army.mil; and CW4 Jeff Putnam, DES, Fort Rucker, AL, DSN 558-2427/1758 (334-255-2427/1758), e-mail: PutnamJ2@rucker.army.mil.

Article references are TM 1-1500-204-23-6, TM 55-1520-228-23-1, and TM 55-1520-228-23P.

1.Yoke
2. Bushing
3. Trunnion
4. Liner-inner
5. Shim
6. Thrust Plug
7. Seat
8. Bearing- Needie
9. Housing Assembly
10. Grease Fitting
11. Bolt (2 Reqd)
12. Washer - Steel (9 maximum)
13. Weight (4 maximum)
14. Insert
15. Date Plate

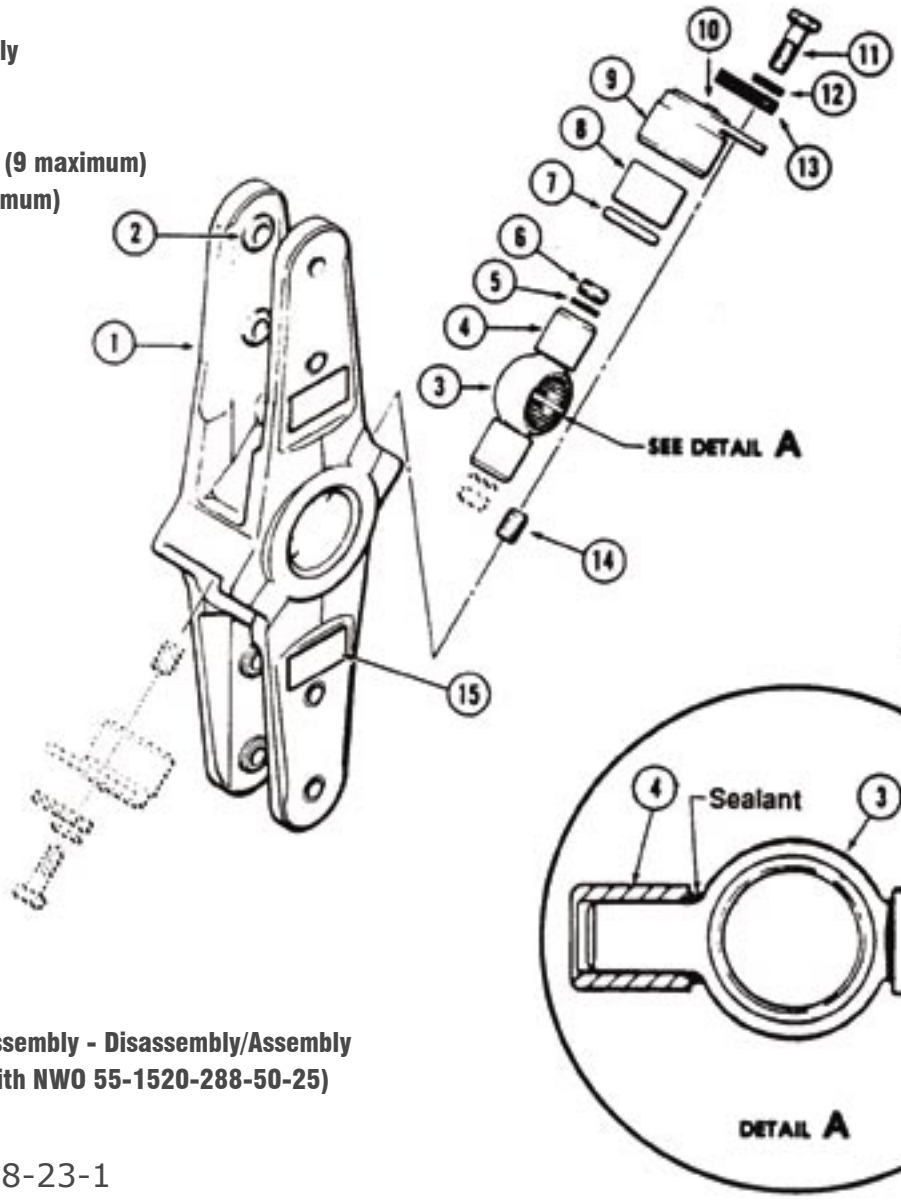

Figure 5-74. Hub Assembly - Disassembly/Assembly (After compliance with NWO 55-1520-288-50-25)

TM 55-1520-228-23-1

Ensure Faceplates Are Correct For PDUs

There is a potential problem that has been brought to light by a unit in the field concerning the interchangeability of the UH-60A and UH-60L pilot display units (PDUs). The problem is that the PDU fits both the UH-60A and UH-60L cockpit displays. One can easily see this could lead to a possible over-torque or over-temp problem; thus resulting in not having the required power to accomplish a given task or mission.

The PDU faceplate is depicted in TM 1-1520-237-23P-2, Figure 197, item 6. There are three different types listed that mate to three different type PDUs that are part specific. The 245-473851-000, 245-601130-000, 245-601538-000 PDUs mate with 622-473870-000 or the 622-601137-000 faceplate, while the 245-601561-000 and the 245-601581-000 PDUs mate with the 622-601530-000 faceplate.

If a UH-60L faceplate is mounted on a UH-60A PDU, or if the wrong PDU is installed on an aircraft, there is a risk of unwittingly exceeding aircraft limitations.

Let's make sure that we are mating the correct faceplate with the correct PDU. Even though a faceplate fits, that does not mean it is the correct faceplate. ♦

PDUs

EH & UH-60A	245-473851-000 245-601130-000 245-601538-000
UH-60L	245-601561-000 245-601581-000

FACEPLATE

EH & UH-60A	622-473870-000 622-601137-000
UH-60L	622-601530-000

—Contributing to this article were CW3 Dean Bailey and Tim Scott, from Data Inc., Utility PM Shop, Redstone Arsenal, AL, and Bob Giffin, USASC UH-60 System Safety Manager, Fort Rucker, AL.

All But One

MSG Shane Curtis
U.S. Army Safety Center

It can happen to anyone.
A moment's inattention almost allowed a Class A accident and possibly many lives lost.

It started one night about 1800 hours. The CH-47 flight crew had just returned from a day mission and the maintenance crew started pulling maintenance—taking oil samples and performing the 100-hour inspection.

Time passed and some of the maintenance had to be done late into the evening. That didn't mean a whole lot, because most of us in the aviation field are used to that. It was 2300 hours when we finished up for the night. The maintenance test flight (MTF) was scheduled for the next day.

The next morning, the crew chief got the aircraft ready. The preflight went without a hitch, everything was closed up, blade ropes were removed, and the aircraft was ready to fly. The MTF went well and only took 40 minutes. The crew completed several checks and the aircraft was back on the ground.

The pilot didn't stick around long because he had other aircraft to check. However, the crew chief needed to clean up from the last mission and get his aircraft ready for another mission that day.

It wasn't until the crew chief opened the driveshaft cover that he realized just how lucky he and his crew had been. He froze when he saw a wrench that he had used the previous night. He thought back to the previous evening and suddenly remembered he hadn't done a tool accountability check. If the driveshaft had come apart in flight, the Army would have had another Class "A" accident to investigate, and possibly a lost crew.

Yes, this guy and the crew were lucky. The crew chief had completed all of his maintenance checks, except for one—the tool accountability check. **ALWAYS, ALWAYS, ALWAYS** account for your tools! Do your tool accountability check each and every time you use your tools. ♦

—MSG Shane R. Curtis, USASC Aviation Systems and Accident Investigation Division, DSN 558-9859 (334-255-9859), e-mail: shane.curtis@safetycenter.army.mil

Correction In the April 2003 *Flightfax* accident briefs, we published two UH-60L Class C accidents and two OH-58D Class C accidents that were duplicates. We regret this *error.*

91,000 Hours and Counting

Julie Shelley
Writer-Editor

Army aviators know that flying can sometimes present precarious situations for themselves and their crew. With a combination of skill, confidence, and maybe a little luck, most aviators will never experience a tragic accident doing what they love. But, how does one gain the skill and confidence required to be "above the best" and safe at the same time?

Experience comes with age, but those first lessons learned in flight school at the U.S. Army Aviation Center, Fort Rucker, AL, set the stage for success for Army aviators. Among those lessons, safety is top priority for both students and instructors. One unit in particular at Fort Rucker has set a standard for others to follow, and recently was awarded a Department of the Army-level honor for their hard work.

In a ceremony this spring CPT Andrew Benjamin, Commander, A Company, 1/212th, Aviation Training Brigade, was presented the Army Award of Excellence in Safety for his unit's outstanding dedication to and accomplishments in safety. The award is presented to units who have gone 36 consecutive months without experiencing a Class A, B, or C accident, a true feat for any unit. A Company, 1/212th, however, surpassed even that goal: at the time their award was presented in March 2003, it had been not 3, but 5 years since their last recorded accident, with a total of nearly 91,000 consecutive flight hours on the logbooks in that time.

The 1/212th's mission is instructing initial entry rotary wing (IERW) common core students in night and night vision goggle (NVG) flight in the OH-58A/C just prior to their graduation. The 20-hour qualification course can be taxing for new and inexperienced aviators, but CPT Benjamin credits what he calls a "blend" of dedicated Department of the Army civilians, contractors, and active-duty personnel within the unit for maintaining their exceptional record.

"I think it's that blend that helps us out a lot. Our civilians stay with the company a lot longer than the active duty, so they don't rotate in and out," he said, explaining that the civilian instructor pilots (IPs) bring a great deal of combined experience to the unit, as well as familiarity with the local terrain and weather patterns. "They provide a lot of continuity for us. The active duty, on the other hand, come in and bring freshness to our training, so no one gets complacent."

In fact, seven civilians still with the company have been in the unit since the last recorded accident: Bob Portman, Denise Aylesworth, Ron Donkowski, Jim Mitchell, Chuck Smith, Gregg Damms, and Rich Guilmette. CW3 Wylie Mathis is the unit safety officer.

CPT Benjamin said the students respond extremely well to the older, seasoned veterans—perhaps too well at times, because they can get a false sense of security thinking nothing can happen to them. To combat complacency and other safety issues, IPs err on the side of conservatism and abide by a "there's always tomorrow night" mentality. In addition, the unit also has what CPT Benjamin terms "outlet valves," such as weekend flying and reallocation of resources. Every night the unit presents a mission briefing to talk over student trends, maintenance problems, and risk mitigation; every month brings a safety meeting; and safety stand-down days are conducted semi-annually and annually.

The unit's safety officer also plays a vital role in the company, according to CPT Benjamin, because the

knowledge he passes down to students will stay with them for the rest of their careers.

"One thing I can say is that I've always had good safety officers," he said. "They're definitely one of the key links. You can have a safety officer that will inhibit training by telling you all the things you can't do. I've been fortunate in that my safety officers have told me ways that we can do things better. They're a big factor in success."

CPT Benjamin said his safety philosophy is one that is passed down from his brigade commander, COL Michael Zonfrelli, and doesn't allow room for interpretation.

"Safety is the one thing that's non-negotiable. A lot of times in the Army, people are afraid to have a zero-defect or zero-tolerance policy. I let everyone know up front that there are some things we can never deviate from, and that is safety. Safe operation of the aircraft should never be in question," he said. "Safety cannot be negotiated."

It appears as though that philosophy is paying off. Congratulations to A Company, 1/212th! ♦

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24th Annual National Aerospace FOD Prevention Conference

The 24th Annual National Aerospace Foreign Object Damage (FOD) Prevention Conference will be held 22-24 July 2003 at the downtown Adams Marks Hotel, 111 East Pecan Street, San Antonio, Texas. There will be two joint military only breakout sessions during the conference. Full multi-service attendance and participation is encouraged.

The hotel room rate is $91 per night. Reservations can be made by calling 1-800-444-2326 and asking for the FOD conference block of rooms. This conference is unit funded and each attendee is responsible for making his own hotel and travel arrangements. Hotel reservations must be made NLT 30 June 2003 to ensure room availability.

Participants are encouraged not to use rental cars due to limited downtown parking. Local shuttle service will be available from the airport to the hotel by San Antonio transit.

There will be a $250 conference registration fee that applies to those who register before 30 June 2003. The registration fee after 30 June 2003 will be $300. The registration fee is fully reimbursable by including it in the "remarks section" of your travel orders. A registration form can be obtained on line at **www.nafpi.com** or by calling HQ ACC LGMP at DSN 574-1826 or (757) 764-1826. All registration forms must be sent or faxed to the conference coordinator listed on the form. The registration fee is payable upon arrival at the conference.

Participation is highly encouraged for FOD program managers and monitors, safety, CE and airfield management personnel. The goal is to ensure all FOD prevention personnel interact in at least one forum to reduce and fight costly FOD.

Uniform requirements will be the service uniform for all military attendees and appropriate civilian attire for all others. ♦

—WG CMDR Craig Fyffe or MSGT James T. Henry,
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A "Sometimes Humbling" Experience

During April 2003, Ms. Julie Shelley and Ms. Paula Allman, both writer-editors for the U.S. Army Safety Center's publications *Flightfax* and *Countermeasure*, traveled with the CP-12 Safety Professional intern class to the National Training Center (NTC) in Fort Irwin, CA. Below is an excerpt from their briefing to BG James E. Simmons, Director of Army Safety and USASC Commanding General. Look for more NTC stories coming soon in both publications!

The NTC is a place designed to push our soldiers to the limit, both physically and mentally. After spending 5 days there, I now know on a very limited scale that a rotation to the NTC isn't a fun-filled TDY trip for our soldiers. To say the very least, the USASC editors' trip to the NTC with the CP-12 intern class was an eye-opening and sometimes humbling experience.

When you sit in an office all day and see accident reports listing nothing but rank, MOS, unit name, and cause of injury or death, it is easy to become desensitized to the reality of what our soldiers face every day—no name, no face goes along with those reports. At the NTC we were able to see, in flesh and blood, just why we are here. Our jobs are about more than checking for correct punctuation, grammar, and spelling—we, too, are committed to keeping our soldiers as safe as possible.

On this trip, we had the privilege and honor of meeting dedicated green-suiters, including COL(P) Joseph Martz and CW3 Mike Burnside; NTC Safety Director Mike Williams, a.k.a "Safety Mike," who is easily one of the most devoted civilians I've ever met; and also enthusiastic contractors with a passion for their work. But an equal honor was meeting some of the junior enlisted soldiers of the Stryker Brigade, who had just come in from a rotation and were tired, hungry, and dirty, but answered all our questions with both pride and a smile. Those are the guys we are here for—the ones who will fight our Nation's wars.

We learned about obvious hazards, but we also gained insight into the subtle hazards desert warfare presents to our soldiers. Who would have thought that a small washout on a sandy road could flip a HMMWV or other tactical vehicle? Someone even had to point out an unexploded simulator round to me because I didn't see its fins sticking up out of the ground—not a hazard I generally encounter in Room 246, U.S. Army Safety Center. I had never flown in a helicopter before, and I've worked with aviation-related documents for the Army for more than 2 years. We slept in barracks and ate MREs. How can you effectively write about something if you've never experienced it? Needless to say, this trip offered us these and many other experiences that we will never forget.

It is stories like these that give us the insight we need to convey to our readers the real dangers that are out there, not only at the NTC, but at any military installation and certainly any battlefield in the world. We have now seen firsthand what the "war stories" are all about, but there are so many more, and we are here to tell them.

On this trip we made invaluable contacts. We've all heard the saying, "It's not what you know, it's who you know." From experience, I can tell you that it's much easier to get information for a story when your POC can put your face with your name. Since we got back, we've even had calls come into our office from NTC personnel, asking us safety related questions! And we cannot leave out the contacts we made in this CP-12 class—these are the people who will be in the field with their soldiers in places we'll probably never see. We are the mouthpiece for Army safety professionals, and these students know they can call us anytime and that we WILL be calling them!

Never before have the USASC editors been given the opportunity to see so much or get to know so many of the people we are here to support. We send many thanks to Dr. Brenda Miller, the CP-12 class, and the NTC staff for allowing us this chance. ♦

—Julie Shelley, Writer-Editor, U.S. Army Safety Center, DSN 558-1218 (334-255-1218), e-mail: shelleyj@safetycenter.army.mil

ACCIDENT BRIEFS

Information based on preliminary reports of aircraft accidents

AH-64

A Model

■ **Class A:** During student training, aircraft yawed left and impacted the ground in a tail-low attitude during training flight and sustained significant damage.

■ **Class C:** The aircraft experienced an auxiliary power unit (APU) clutch separation from the APU drive while in flight. The crew performed a precautionary landing.

■ **Class E**: The #2 engine failed in flight. The pilot-in-command smelled smoke inside the aircraft, but there was no evidence of fire. Aircraft landed safely.

MH-47

E Model

■ **Class D:** While conducting an aft two-wheel landing on a 7,000-foot pinnacle during an infiltration mission, the aircraft became unstable on the aft wheels and yawed right. As the aircraft departed the site, the AFT CARGO HOOK OPEN light illuminated. The flight to home station was uneventful. Post-flight inspection revealed the loss of the aft cargo hook and damage to the underside of the aircraft.

OH-58

C Model

■ **Class C:** Aircraft landed hard while the instructor pilot (IP) was demonstrating a low-level autorotation during contact training.

DI Model

■ **Class C:** During a post-flight MOC, the engine experienced a 134 percent overspeed condition (following reported chip-light landing).

UH-60

A Model

■ **Class A:** Aircraft crashed during a MEDEVAC mission, resulting in three fatalities. No further details were reported.

■ **Class C:** While conducting aircrew training manual (ATM) and goggle training, the aircrew was making an approach for landing when the aircraft drifted toward the trees on the opposite side of the CE. The crew corrected the drift, but did not notice the main rotor blades striking the trees and continued training for an additional 40 minutes. Post-flight inspection revealed damage to all four tip caps and potential damage to one blade.

■ **Class D:** On final, the MASTER CAUTION light flickered twice, the #2 engine oil pressure began to drop (40-50 PSI), and an unusual noise started coming from the #2 engine. As pressure continued to drop and the noise level increased, the crew initiated an emergency engine shutdown of the #2 engine and executed a roll-on landing to the runway without further incident.

L Model

■ **Class B:** Aircraft was Chalk 4 in a flight of four when their mission was cancelled due to deteriorating weather. The aircraft were departing for the airfield from their pickup zone (PZ) when, during a right turn to avoid weather, Chalk 4 impacted the ground with its main landing gear. Damage to the right front portion and right side stabilator was noted, and structural damage is suspected. Two crew members were injured in the accident.

■ **Class E:** Following normal start of the #1 and #2 engines, both power control levers (PCLs) were advanced to FLY. After "droops out" was called by the crew chief, the pilot on the controls reduced the collective. The #1 engine's power turbine speed (N_p) and RPM continued to accelerate to approximately 120 percent. The pilot not on the controls reduced both PCLs to IDLE, with no effect. Both engines were then shut down. It was determined that the hydromechanical unit (HMU) had failed.

■ **Class E:** The aircraft's stabilator failed during final approach after the auto control was reset. The manual control gave 24 degrees of stabilator movement, and the final approach was completed without incident. It was determined the electro-mechanical unit actuator failed.

RC-12

D Model

■ **Class E:** During takeoff roll prior to V1, the aircraft struck a bird. The crew taxied back to the ramp. Maintenance inspected the aircraft and found the taxi light bulb broken. Maintenance repaired and released the aircraft for flight.

P Model

■ **Class E:** The pilot's windshield cracked in numerous spots at flight level (FL) 300. The mission was terminated due to the damage.

■ **Class E:** The aircraft experienced total electrical failure in flight. The mission was terminated without incident. Failure of the #1 starter generator and #2 GCU was noted during the post-flight inspection.

■ **Class E:** During flight, oil seepage was detected on the #1 engine cowling. The aircraft mission was terminated. Post-flight inspection revealed failure of the #1 prop seal.

Editor's note: Information published in this section is based on preliminary mishap reports submitted by units and is subject to change. For more information on selected accident briefs, call DSN 558-9552 (334-255-9552) or DSN 558-3410 (334-255-3410). There have been numerous accidents in Kuwait and Iraq since the beginning of Operation Enduring Freedom. We will publish those details in a future Flightfax article.

YOU DON'T NEED A SLOPE TO HAVE A Dynamic Rollover

Since 1992 75% of dynamic rollover accidents have occurred on LEVEL GROUND