CIVIL AVIATION SAFETY AUTHORITY OF PAPUA NEW GUINEA

SAFETY ALERT BULLETIN

SAB NO: 02/2022

DATE 09/11/2022

A SAB contains important safety information and may include recommended action. SAB content should be especially valuable to air operators in meeting their statutory duty to provide service with the highest degree of safety in the public interest. Besides specific action(s) recommended in a SAB, an alternative action may be as effective in addressing the safety issue named in the SAB.

TITLE: PNG Helicopter Operations – Inadvertent Flights into Instrument Meteorological Conditions (IIMC) and Lost Procedures

OBJECTIVE:

This SAB provides safety guidance information to help helicopter pilots avoid accidents when:

- Encountering disorientation, flying over unfamiliar territory, or in visibility conditions that is low enough to render familiar terrain unfamiliar; and

- flying in unforecast weather conditions that may quickly deteriorate into degraded visibility conditions placing the pilot in a situation of increased risk of unintentional flight in Instrument Meteorological Conditions (UIMC).

APPLICABILITY: This SAB is applicable to PNG Helicopter pilots.

BACKGROUND:

Recent accidents within the PNG Helicopter operations were a result of inadvertent flight into Instrument Meteorological Conditions.

Helicopter pilots should always expect the worst hazards and possible aerodynamic effects and plan for a safe exit path or procedure to compensate for the hazard. Recovery needs to be quick and precise. By

Civil Aviation Safety Authority of PNG
P O Box 1941
Boroko
National Capital District

Telephone: + 675 325 7320
Fax: + 675 325 1919
Website: www.casapng.gov.pg

having a thorough knowledge of the helicopter, its systems, anticipation of possible malfunctions and failures, and methods of recovery will help a pilot avoid accidents and be a safer pilot.

Helicopter emergencies and the proper recovery procedures should be discussed and, when possible, practiced in flight. In addition, by knowing the conditions that can lead to an emergency, many potential accidents can be avoided.

Lost Procedures

Pilots may become lost while flying for a variety of reasons, such as disorientation, flying over unfamiliar territory, or visibility that is low enough to render familiar terrain unfamiliar. When a pilot becomes lost, the first order of business is to fly the helicopter; the second is to implement lost procedures. Keep in mind that the pilot workload will be high, and increased concentration will be necessary. If lost, always remember to look for the practically invisible hazards, such as wires, by searching for their support structures, such as poles or towers, which are almost always near roads.

If lost, follow common sense procedures:

- Try to locate any large landmarks, such as mountains, lakes, rivers, towers, railroad tracks, or Interstate highways. If a landmark is recognized, use it to find the helicopter's location on the sectional chart. If flying near a town or city, a pilot may be able to read the name of the town on a water tower or even land to ask for directions.
- If no town or city is nearby, the first thing a pilot should do is climb. An increase in altitude increases radio and navigation reception range as well as radar coverage.
- Navigation aids, dead reckoning, and pilotage are skills that can be used as well.
- Do not forget air traffic control (ATC)—controllers assist pilots in many ways, including finding a lost helicopter. Once communication with ATC has been established, follow their instructions.

These common-sense procedures can be easily remembered by using the 4 Cs: Climb, Communicate, Confess, and Comply:

- **Climb** for a better view, improved communication and navigation reception, and terrain avoidance.
- **Communicate** by calling the nearest flight service station (FSS) applicable to the area of operation. If the FSS does not respond, call the nearest control tower, center, or approach control. For frequencies, check the chart in the vicinity of the last known position. If that fails, switch to the emergency radio frequency (121.5 MHz) and transponder code (7700).
- **Confess.** Report the lost situation to ATC and request help.
- **Comply** with controller instructions.

Pilots should understand the services provided by ATC and the resources and options available. These services enable pilots to focus on aircraft control and help them make better decisions in a time of stress.

When contacting ATC, pilots should provide as much information as possible because ATC uses the

information to determine what kind of assistance it can provide with available assets and capabilities. Information requirements vary depending on the existing situation, but at a minimum a pilot should provide the following information:

- Aircraft identification and type
- Nature of the emergency
- Aviator's desires

To reduce the chances of getting lost in the first place, use flight following through active contact with an aircraft during flight either by radio or through automated flight following systems when it is available, monitor checkpoints no more than 25 miles apart, keep navigation aids such as Very High-Frequency Omni-Directional Range (VOR) tuned in, and maintain good situational awareness. Flight following provides ongoing surveillance information to assist pilots in avoiding collisions with other aircraft.

Getting lost is a potentially dangerous situation for any aircraft, especially when low on fuel. Due to the helicopter's unique ability to land almost anywhere, pilots have more flexibility than other aircraft as to landing site. An inherent risk associated with being lost is waiting too long to land in a safe area. Helicopter pilots should land before fuel exhaustion occurs because maneuvering with low fuel levels could cause the engine to stop due to fuel starvation as fuel sloshes or flows away from the pickup port in the tank.

If lost and low on fuel, it is advisable to make a precautionary landing. Preferably, land near a road or in an area that would allow space for another helicopter to safely land and provide assistance. Having fuel delivered is a minor inconvenience when compared to having an accident. Once on the ground, pilots may seek assistance.

VFR Flight into Instrument Meteorological Conditions

Helicopters, unlike airplanes, generally operate under Visual Flight Rules (VFR) and require pilots to maintain aircraft control by visual cues. However, when unforecast weather leads to degraded visibility, the pilot may be at increased risk of Inadvertent flight into Instrument Meteorological Conditions (IIMC). During an IIMC encounter, the pilot may be unprepared for the loss of visual reference, resulting in a reduced ability to continue safe flight. IIMC is a life- threatening emergency for any pilot. To capture these IIMC events, the International Civil Aviation Organization (ICAO) Common Taxonomy Team (CICTT) categorizes this occurrence as Unintended flight in Instrument Meteorological Conditions (UIMC). This term is also recognized by CASA PNG to classify occurrences (accidents and incidents) at a high level to improve the capacity to focus on common safety issues and complete analysis of the data in support of safety initiatives.

The onset of IIMC may occur gradually or suddenly, has no simple procedural exit, and is unlike flight training by reference to while in Visual Meteorological Conditions (VMC). Most training helicopters are not equipped or certified to fly under Instrument Flight Rules (IFR). Therefore, helicopter pilots may not have the benefit of flight in actual Instrument Meteorological Conditions (IMC) during their flight training. Helicopter pilots that encounter IIMC may experience physiological illusions which can lead to spatial disorientation and loss of aircraft control. Even with some instrument training, many available

and accessible helicopters are not equipped with the proper augmented safety systems or autopilots, which would significantly aid in helicopter control during an IIMC emergency. The need to use outside visual references is natural for helicopter pilots because much of their flight training is based upon visual cues, not on flight instruments. This primacy can only be overcome through significant instrument training. Additionally, instrument flight may be intimidating to some and too costly for others. As a result, many helicopter pilots choose not to seek an instrument rating.

While commercial helicopter operators often prefer their pilots to be instrument rated, fatal accidents still occur as a result of IIMC. Many accidents can be traced back to the pilot's inability to recover the helicopter after IIMC is encountered, even with adequate equipment installed. Therefore, whether instrument rated or not, all pilots should understand that avoiding IIMC is critical.

A good practice for any flight is to set and use personal minimums, which should be more conservative than those required by regulations for VFR flight. In addition, a thorough preflight and understanding of weather conditions that may contribute to the risk of IMC developing along a planned route of flight is essential for safety. Pilots should recognize deteriorating weather conditions so the route of flight can be changed or a decision made to terminate the flight and safely land at a suitable area, well before IIMC occurs. If weather conditions deteriorate below the pilot's personal minimums during flight, a pilot who understands the risks of IIMC knows that he or she is at an en route decision point, where it is necessary to either turn back to the departure point or immediately land somewhere safe to wait until the weather has cleared. Pilots should recognize that descent below a predetermined minimum altitude above ground level (AGL) (for example, 500 feet AGL) to avoid clouds or, slowing the helicopter to a predetermined minimum airspeed (for example, slowing to 50 KIAS) to reduce the rate of closure from the deteriorating weather conditions, indicates the decision point had been reached. Ceilings that are lower than reported and/or deteriorating visibility along the route of flight should trigger the decision to discontinue and amend the current route to avoid IIMC.

If the helicopter pilot is instrument rated, it is advisable to maintain instrument currency and proficiency as this may aid the pilot in a safe recovery from IIMC. A consideration for instrument rated pilots when planning a VFR flight should include a review of published instrument charts for safe operating altitudes, e.g. minimum safe altitude (MSA), minimum obstruction clearance altitude (MOCA), minimum in VMC throughout a flight: off-route altitude (MORA), etc. If IIMC occurs, the pilot may consider a climb to a safe altitude. Once the helicopter is stabilized, the pilot should declare an emergency with air traffic control (ATC). It is imperative that the pilot commit to controlling the helicopter and remember to **aviate, navigate, and finally communicate.** Often communication is attempted first, as it is natural to look for help in stressful situations. This may distract the pilot from maintaining control of the helicopter.

If the pilot is not instrument rated, instrument current nor proficient, or is flying a non-IFR equipped helicopter, remaining in VMC is paramount. Pilots who are not trained or proficient in flight solely by reference to instruments have a tendency to attempt to maintain flight by visual ground reference, which tends to result in flying at lower altitudes, just above the trees or by following roads. The thought process is that, "as long as I can see what is below me, I can continue to my intended destination." Experience and statistical data indicate that attempting to continue VFR flight into IMC can often lead to a fatal outcome as pilots often fixate on what they see below them and are unable to see the hazards ahead of them (e.g., power lines, towers, rising terrain, etc.). By the time the pilot sees the hazard, it is either too late to avoid a collision, or while successfully maneuvering to avoid an obstacle, the pilot becomes disoriented.

Flying at night involves even more conservative personal minimums to ensure safety and avoidance of IIMC than daytime flying. At night, deteriorating weather conditions may be difficult to detect. Therefore, pilots should ensure that they not only receive a thorough weather briefing, but that they remain vigilant for unforecasted weather during their flight. The planned route should include preselected landing sites that will provide options to the pilot in the event a precautionary landing is

required to avoid adverse weather conditions. As a pilot gains night flight experience their ability to assess weather during a flight will improve.

Below are some basic guidelines to assist a pilot to remain in VMC throughout a flight:

1. Slowly turn around if threatened by deteriorating visual cues and proceed back to VMC or to the first safe landing area if the weather ahead becomes questionable. Remember that prevention is paramount.
2. Do not proceed further on a course when the terrain ahead is not clearly discernible.
3. Delay or consider cancelling the flight if weather conditions are already questionable, could deteriorate significantly based on forecasts, or if you are uncertain whether the flight can be conducted safely. Often, a "gut-feeling" can provide a warning that unreasonable risks are present.
4. Always have a safe landing area (such as large open areas or airports) in mind for every route of flight.

There are five basic steps that every pilot should be familiar with, and which should be executed immediately at the onset of IIMC, if applicable. However, remember that if you are not trained to execute the following maneuvers solely by reference to instruments, or your aircraft is not equipped with such instruments, this guidance may be less beneficial to you and loss of helicopter control may occur:

1. **Level the "wings"** – level the bank angle using the attitude indicator.
2. **Attitude** – set a climb attitude that achieves a safe climb speed appropriate to your type of helicopter. This is often no more than 10° of pitch up on the attitude indicator.
3. **Airspeed** – verify that the attitude selected has achieved the desired airspeed. It is critical to recognize that slower airspeeds, closer to effective translational lift, may require large control inputs and will decrease stability, making recover impossible while in UIMC.
4. **Power** – adjust to a climb power setting relative to the desired airspeed. This should be executed concurrent with steps 2 and 3.
5. **Heading and Trim** – pick a heading known to be free of obstacles and maintain it. This will likely be the heading you were already on, which was planned and briefed. Set the heading bug, if installed, to avoid over- controlling your bank. Maintain coordinated flight so that an unusual attitude will not develop.

Try to avoid immediately turning 180°. Turning around is not always the safest route and executing a turn immediately after UIMC may lead to spatial disorientation. If a 180° turn is the safest option, first note the heading you are on then begin the turn to the reciprocal heading, but only after stable flight is achieved (items 1 through 5 above) and maintain a constant rate of turn appropriate to the selected airspeed.

Each encounter with UIMC is unique, and no single procedure can ensure a safe outcome. Considerations

in determining the best course of action upon encountering UIMC should include, at a minimum, terrain, obstructions, freezing levels, aircraft performance and limitations, and availability of ATC services.

There are new technologies being developed regarding aircraft design, enhanced and lower-cost technologies, and aircraft certification. Because of this promising future, much of the discussion and guidance in this chapter may one day become irrelevant. As helicopters integrate more into the National Airspace System, the IFR infrastructure and instrument training will become more prevalent. In the future, UIMC may no longer be the emergency that ends with a fatality but rather associated with proper prevention, skilled recovery techniques along with the aid of emerging new life saving avionics technology.

A helicopter instrument rating may be a life-saving addition to a pilot's level of certification.

When faced with deteriorating weather, planning and prevention, not recovery, are the best strategies to eliminate UIMC-related accidents and fatalities.

ENQUIRIES:

For any further enquiries regarding the contents of this Safety Information Bulletin (SIB), you may contact the CASA PNG Manager Flying Operations Branch:

Capt. Malakai Nawai
Manager Flying Operations Branch
Safety Regulation Division
Civil Aviation Safety Authority of Papua New Guinea
P.O.BOX 1941 Boroko, NCD, PNG
Email: mnawai@casapng.gov.pg