National Defence | Défense nationale

Flight Comment

ISSUE 3, 2024

DOSSIER
Threat vs Challenge

LESSONS LEARNED
Transforming the Night Sky

FROM THE FLIGHT SURGEON
Flying High?

Canada

Cover – Master Corporal Chris Dubé stands by the open door of the CH148 Cyclone helicopter as it flies alongside HMCS Charlottetown, during EX STEADFAST DEFENDER 24, the North Atlantic Ocean, on 01 March 2024.

Photo by: Pte Brendan Gamache, Canadian Armed Forces

Photo: Aviator Gregory Cole

Photo: MCpl Alana Morin

Flight Comment

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Views on Flight Safety

by CWO Robichaud, CD

This summer marks the completion of my first year as the Chief Warrant Officer for the Directorate of Flight Safety (DFS), a role that has afforded me a unique perspective. Unlike typical positions, where occurrences are often localized within specific units such as Squadrons, Wings, or fleets, my role within DFS provides a comprehensive view of air operations across the Canadian Armed Forces (CAF).

I firmly believe that our training equips us to execute tasks safely and professionally. However, despite our commendable ability in handling complex duties, there has been a noticeable increase in Flight Safety occurrences during ground operations in recent years. Specifically, incidents involving towing mishaps, damage caused by Aircraft Maintenance Support Equipment (AMSE), and maintenance stands have occurred more than once a week across the CAF.

As an organization, it is crucial that we reflect on the underlying reasons for this rise in incidents; particularly in tasks that are essential. This issue has been a focal point during recent roadshows, where we have engaged in discussions regarding potential contributing factors such as distractions, complacency, and varying levels of experience. Developing effective preventive measures poses a significant challenge for the Flight Safety Team, given that many of these incidents stem from human error. DFS is actively preparing to launch a comprehensive Ground Incident Prevention campaign to address these concerns.

It is no secret that the RCAF does not possess a vast fleet of aircraft. Therefore, it is essential to grasp the impact of these incidents on our operations. While projecting Air Power is pivotal for the RCAF, many of these incidents occur on serviceable aircraft, thus impairing our ability to project Air Power effectively. Consequently, significant resources are diverted to investigate, repair, and in some cases, test the damage caused by these incidents. With our current personnel shortages, it is imperative that we minimize unnecessary workload.

In response, I urge personnel at every level to step back and meticulously assess all aspects of their tasks. Adopting a disciplined and professional approach, minimizing distractions, and actively guarding against complacency are essential. Everyone must take ownership of their responsibilities, and supervisors must ensure accountability within their teams. This accountability starts with:

- understanding the tasks;
- effectively communicating the plan;
- safely executing it with well-trained and qualified personnel;
- providing adequate supervision to those in training; and
- ultimately, taking swift action or responsibility when incidents occur.

By steadfastly adhering to these principles, we can collectively enhance safety standards across all operations, fostering a culture of excellence and continuous improvement within the Canadian Armed Forces.

Technician's creed

Upon my honour, I swear that I hold in sacred trust the right and privileges conferred upon me as a qualified technician. Knowing full well that safety and lives of others are dependent upon my skill and judgement, I will never knowingly subject others to risks which I would not be willing to assume for myself.

In discharging the trust, I pledge myself never to undertake work or approve work which I feel to be beyond the limits of my knowledge; nor will I allow anyone to persuade me to approve aircraft or equipment as serviceable against my better judgement; nor will I permit my judgement to be influenced by personal comforts or advantages; nor will I approve a serviceable aircraft or equipment about which I am in doubt, either as a result of direct inspection or uncertainty regarding the ability of others who have worked on it to accomplish their work satisfactorily.

I realize the grave responsibility which is mine as a qualified technician to exercise my judgement on the condition of aircraft and equipment. I therefore, pledge unyielding adherence to these precepts for the advancement of aviation and for the dignity of my profession.

Adopted from the Mechanic's creed (1941) written by Jerome Lederer.

The Editor's Corner

by Flight Comment Editorial Team

2024 is an important year for *Flight Comment* as it marks the 75th anniversary of the first publication of our flight safety magazine. This magazine was released in 1949 by the Accident Investigation Branch based out of RCAF Headquarters in Ottawa, Ontario, and was titled *Crash Comment*.

A lot has changed since the initial release of this quarterly magazine. In the early 1950s, to recognize the importance of flight safety education and prevention, the Accident Investigation Branch became the Directorate of Flight Safety (DFS), and *Crash Comment* was rebranded as *Flight Comment*. This helped shift the conversation away from the "crash" where the actions of aircrew or ground crew were often blamed for the accident. In some cases, those deemed responsible were disciplined or financially penalized to recoup the cost of the damage... a $50 fine was a huge blow to the wallet in those days! Over the past 75 years, our understanding of how best to implement a flight safety culture has evolved. We have learned that we need to understand the "why" behind the "what" so we can implement truly effective preventive measures. We are not just waiting for a "crash" to galvanize a response, instead our RCAF leaders actively promote a proactive approach to prevention.

What has not changed over the years is the need to "Comment" on our flight safety findings so that our lessons learned can be shared. Flight Comment is released approximately three times a year in print and digital format to an audience that primarily consists of RCAF personnel, but also includes civilian aviation operators, foreign air forces and external flight safety organisations. Our words and images are sent out globally, and it is incredibly gratifying when we receive feedback from our readers or requests from external agencies who wish to republish our articles or posters. Please keep the feedback and requests coming!

This issue of Flight Comment emphasizes the need to challenge our understanding of our current aviation realities. Social and behavioural norms and practices are incredibly strong and are usually built on best practices learned through trial and error, but they are not always appropriate for every situation. This topic is presented in the Check Six article "The Trouble with Norms" by Col (Ret'd) Shelley. Being willing to challenge the status quo and hunt down answers when things do not make sense is a recurrent theme for our flight safety award recipients. Our DFS Flight Surgeon, Major Stewart, has written an article about maintaining flight safety and operational readiness while navigating the use of cannabis within the RCAF. Having an in depth understanding of our human response to stressful situations can lead us to develop effective measures as presented in "After the Scare," "Stressed by Over Stress" and "Emergencies: Threat vs Challenge Environment."

As our magazine evolves to keep pace with our ever-increasing flight safety knowledge, we would like to thank the personnel behind the scenes who make all this happen. We extend a huge thank you and best wishes to Major Jill Sicard, who has been the Editor of *Flight Comment* for the past few years, as she moves on to the next great challenge! As she so aptly wrote, "Ladies and Gentleman, please ensure your seat back is upright and baggage stowed so you can enjoy this issue of *Flight Comment* and thank you for choosing us as your Flight Safety reading material." We hope to keep you informed and entertained for the next 75 years!

Photo: OS Joel Michaud

Good Show

For Excellence in Flight Safety

Corporal Seung Ha Kim and Aviator Caleb Paturel

Photo: Private Joshua Schultz

On the evening of 8 March 2024, Cpl Kim and Avr Paturel were assisting Cpl Huang in a leak check of a CT142 main landing gear following an inflight emergency landing due to a sudden loss of hydraulic pressure.

After completing several other checks to no avail, it was necessary to inspect the hydraulic lines in the wheel well while pressure was applied to the system to source the leak. While Cpl Huang positioned himself in the wheel well, Avr Paturel and Cpl Kim stood by as observers for safety. As secondary hydraulic pressure was applied from the cockpit, both Cpl Kim and Avr Paturel quickly noticed that the main landing gear doors had begun to close on Cpl Huang. Without hesitation, the two technicians grabbed a hold of the doors that were trapping Cpl Huang, and resisted the hydraulic force being applied, effectively preventing what could have been a catastrophic accident.

It was later identified that the safety pin for the main landing gear doors was not installed due to an abnormal emergency shut down procedure and subsequently missed on a walkaround inspection. The missing pin allowed the doors to begin closing as soon as hydraulics were applied.

Their outstanding situational awareness and quick reaction both physically restraining the doors and immediately calling for the shutoff of hydraulic power provided Cpl Huang the time and space to escape the wheel well unharmed. For these actions, Cpl Kim and Avr Paturel are both well deserving of the Flight Safety *Good Show* Award.

For Professionalism

For Commendable Performance in Flight Safety

Corporal Douglas Hamilton

Photo: Avr Nicholas Zahari

On 11 April 2024, during a separate inspection in the vicinity of the number four engine truss mount on a Hercules CC130, Cpl Hamilton an ACS (Aircraft Structures) technician, discovered an engine truss mount bolt not fully installed. Upon closer examination, Cpl Hamilton found the bolt to be the wrong length and the nut only engaging three threads. Further inspection revealed that a second truss mount bolt was also the incorrect length. After looking through records, it was determined that in October 2023, a conditional inspection was carried out for a hard landing in which the engine truss mounts were removed. During the reinstallation, the two shorter bolts were inserted where the longer bolts were required and vice versa, leading to improper threading.

Engine truss mount bolts are essential for securing the engine to the aircraft and the improper installation could have led to the nut coming loose and the bolt dislodging, posing a serious risk of an accident, loss of engine or possibly even aircraft. Cpl Hamilton's diligence led to the identification of a Flight Safety occurence despite not being responsible for inspecting the truss mounts.

Cpl Hamilton's knowledge, good judgment and situational awareness caught a critical hazard that had been overlooked for more than 6 months. If it was not for his keen work ethic, this error could have caused significant damage. For his great work and commitment, Cpl Hamilton is highly deserving of the *For Professionalism* Award.

From the Flight Surgeon

Flying High

by Maj Phil Stewart CD, MD

One of the increasingly discussed issues we face is navigating the use of cannabis within our ranks. The 2018 legalization of cannabis in Canada, and the ongoing adjustments brought about by the COVID-19 pandemic since January 2020, have significantly influenced patterns of substance use. As discussed below, this poses many unique challenges to the management of our safety-sensitive roles.

Navigating Cannabis Use in the Royal Canadian Air Force: Ensuring Safety and Operational Integrity

As the Flight Safety Medical Advisor for the Royal Canadian Air Force (RCAF), my duty and mission-critical imperative is to oversee the safety impacts of our aeromedical policies while considering the health and well-being of our personnel. The topic of cannabis use within the RCAF is one that requires careful consideration, especially in light of changing societal attitudes and evolving regulatory frameworks. In this article, I aim to explore the impacts of cannabis legalization in Canada, the effects of COVID-19, and how our internal policies[1] and direction from the Aeronautics Act guide our approach to maintaining flight safety and operational readiness.

The Impact of Cannabis Legalization in Canada

Since the legalization of cannabis on October 17, 2018, Canada has experienced a notable shift in public perception and consumption patterns. According to data published in the Canadian Cannabis Survey (an annual survey by Health Canada gathering information to track changes in cannabis use over time), reported cannabis use in the preceding 12 months among Canadian adults rose from 22% in 2018 to 27% in 2023. Remarkably, nearly one in four of these individuals now reports using cannabis daily or nearly daily. Public perception of the social acceptability of cannabis use shifted as well, with 28% in 2018 deeming it "completely acceptable" compared to 54-58% in 2023 depending on whether ingested or inhaled. The legalization has led to increased availability and acceptance of

1. DAOD 9004-1, Flight Surgeon Guideline (FSG) 1400-02, etc.
2. October 2023 edition
3. Persistent and severe vomiting leading to weight loss and dehydration

cannabis products, which has implications for safety-sensitive roles within organizations including our own.

Although the Canadian Armed Forces (CAF) data is not disaggregated in this survey, it is reasonable to infer that these shifting trends extend to military personnel, including those in the RCAF. Beyond the direct impact on individuals, it is essential to consider the second order effects that may influence RCAF personnel as well. A recent article in the Canadian Medical Association Journal[2] (CMAJ) highlighted significant increases in emergency department visits related to cannabis use since its legalization. Specifically, there has been a thirteen-fold rise in visits for cannabis-induced hyperemesis[3], a doubling of pregnancy-care related visits, and a three-fold increase in cases of cannabis poisoning among children – just to name a few. Less familiar among users may be the significant cardiac effects of cannabis. When such issues impact family members and loved ones, this can have a detrimental impact on the well-being of our personnel and, consequently on their ability to perform optimally.

The Influence of COVID-19 on Cannabis Use Trends

When Canada became the first major industrialized country to legalize recreational cannabis (other countries such as Uruguay legalized prior to Canada), government agencies meticulously planned for the myriad changes this policy shift would usher in. But, hot on its heels came the COVID-19 pandemic and we could never have foreseen the plethora of unique challenges to military operations and personnel well-being that would result. While it is difficult to separate the effects of a maturing and expanding legal cannabis market from the impact of the COVID-19 pandemic, numerous reports have illustrated how lockdowns, isolation measures, and disruptions to daily routines influenced patterns of substance use among the general population, with RCAF members being no exception. Some people began to use recreationally available cannabis to self-medicate for various conditions such as pain and sleep disturbances, instead of seeking professional medical care. While concrete data on cannabis use during the pandemic within the RCAF is still emerging, anecdotal evidence suggests a complex interplay between stress, coping mechanisms, and changes in personal habits.

The Canadian Forces Health Services core of aeromedical specialists remain vigilant in monitoring these evolving trends. We are committed to adapting our strategies to support personnel through education, resilience-building initiatives, and enhanced mental health resources. Our goal is to ensure that all members have access to the support they need to navigate these challenging times safely and effectively.

Substance Use Disorders and your Air Factor: Flight Surgeon Guideline (FSG) 1400-02

In general, aircrew and persons managing aircrew should make themselves familiar with the FSGs, as these guide the aeromedical decisions made by your Flight Surgeon to determine your fitness and air factor. FSG 1400-02 is of particular relevance since it outlines the approach for managing substance use disorders amongst aircrew and was recently updated in January 2024. Despite a solid basis in the most recent evidence in addiction medicine, reactions suggested lack of familiarity with best practices among some members of the RCAF community. The guideline emphasizes that treatment for a substance use disorder entails abstinence from all mood-altering substances (excepting caffeine, nicotine and medication prescribed by a Flight Surgeon). It also underscores the role of Flight Surgeons and medical professionals in providing support through education, counseling, and rehabilitation efforts.

The guideline also addresses the complexities of substance use within a military context, recognizing the potential impacts on individual health and operational readiness. By adhering to FSG 1400-02, we ensure that personnel receive the necessary care and support while upholding the stringent standards required for safety -sensitive roles in aviation.

Educational Initiatives and Support Systems

Educational initiatives and support systems are crucial for promoting awareness and mitigating risks associated with cannabis use in the CAF. These efforts extend beyond regulatory frameworks, focusing on both occupational and social impacts to ensure the health and safety of personnel.

Continued on next page

As the Flight Safety Medical Advisor, a significant part of my role involves disseminating evidence-based information about all aeromedical subjects. For cannabis, this includes its physiological effects and the well-documented impairment of cognitive function, reaction times, and decision-making abilities that are critical to aviation safety. These educational efforts help CAF members understand the risks associated with cannabis use and make informed decisions about their health and operational readiness.

The social impact of cannabis use can be just as significant, affecting not only the individual but their families and communities as well. To address this, the CAF provides a range of important resources on the subject:

- Health effects of cannabis – Canada.ca
- Cannabis and your health: 10 ways to reduce risks when using, Cannabis and your health: 10 ways to reduce risks – Canada.ca
- Cannabis and mental health – Canada.ca
- Cannabis use and cannabis use Disorder – PMC (nih.gov)
- Safe storage of cannabis – Canada.ca
- Cannabis poisonings in children – Canada.ca
- Cannabis Resources – Drug Free Kids Canada
- Cannabis education resources – Canada.ca

By fostering a culture of responsibility and accountability, we empower RCAF personnel to make informed decisions regarding their health and well-being. We emphasize the importance of seeking help for substance use issues and provide confidential avenues for support without fear of stigma or professional repercussions. For any specific questions or concerns, members are encouraged to consult their healthcare provider or flight surgeon for a confidential discussion.

Addressing Concerns Raised Regarding Increased Cannabis Use

Recently, concerns have been raised regarding an uptick in cannabis use among personnel in safety-sensitive roles within the RCAF. Reports indicating non-adherence to prescribed prohibition periods before engaging in duty are particularly troubling and underscore the need for enhanced education and enforcement of existing regulations. Please watch for updates in the policy which will aim to better capture and delineate the personnel and trades that are required to adhere to the more stringent limitations of cannabis use in order to eliminate any ambiguity of interpretation.

Ultimately, it is crucial that all personnel understand the implications of cannabis use on their health, safety, and professional responsibilities. I urge our entire RCAF community, particularly chains of command, to fully understand their obligations under DAOD 9004-1 and FSG 1400-02, which are in place to safeguard our operational integrity and ensure the safety of everyone involved in our missions.

Flight Safety Officers (FSOs), Investigations, Medical Interactions and the Law

The Aeronautics Act provides substantial investigative powers to FSO's through the AIA. To uphold our position within the RCAF and support our Just Culture, it is crucial that we use these powers appropriately and judiciously.

UFSOs and WFSOs may, in the course of an investigation:

- Require a person who is directly or indirectly involved in the operation of an aircraft to submit to a **medical examination**[4] provided they are willing[5]
- Collect and quarantine personal medical information but must forward it as "confidential" to the DFS Surgeon as they are not authorized to review it themselves[6]

NOTE: when exercising this power the investigator must:

- Ensure the DFS Surgeon is notified at the earliest possible time
- Engage with DFS if the person in question is not willing to comply
- Ensure the person to be examined is not permitted to eat or drink prior to the physician assessment and collection of blood and/or urine is indicated

4. *"A medical examination does not include any procedure involving surgery, perforation of the skin or any external tissue or the entry into the body of any drug or foreign substance. However, the person may be required to provide a urine sample."* Military Airworthiness Investigation Regulations (MAIR), Form 4
5. Aeronautics Act S14(10)(b)
6. Aeronautics Act S14(10)(b)

UFSOs and WFSOs may not:

- Request or demand toxicology screening as this is strictly a medical function and will be determined by the examining clinician
- Compel an unwilling person to submit to a medical examination without the explicit direction of the AIA
- Compel an unwilling clinician or medical staff to release medical examination results without the explicit direction of the AIA
- Seek out the results of any portion of the medical examination, including toxicology results outside of that provided to them directly by the DFS Surgeon

As a special note for CoCs, the results obtained from a FS investigation are privileged and must not be shared with command. While DFS understands the potential importance of this information for CoCs in managing their subordinates, it is crucial that any collateral requests or investigations on behalf of command are conducted through parallel, but distinctly separate, channels as outlined in the QR&Os. Command teams may coordinate with Health Services, following appropriate policies, to obtain relevant information in a timely manner. However, it is essential to emphasize that DFS and any results acquired under the Aeronautics Act must remain separate from these efforts.

In Conclusion: Upholding Safety and Operational Excellence

Navigating cannabis use policies and processes within the RCAF demands a comprehensive and proactive approach that integrates regulatory compliance, education, and support for personnel. The Canadian Forces Health Services remain dedicated to assisting personnel through these identified needs through resilience-building and improved mental health resources. By promoting accountability and providing confidential support, we empower individuals to make informed decisions about their health and well-being without fear of stigma such that they may perform their duties safely and effectively, both in the air and on the ground.

Leadership, along with all members should familiarize themselves with key policies, such as Section 8 of the DAOD and Chapter 20 of the QR&Os, to address cannabis misuse responsibly as there are a multitude of measures that can be applied to aid in identifying and deterring inappropriate use of illicit substances beyond those afforded by the Aeronautics Act which are privileged and intended for powers of investigations. It is additionally essential for everyone, especially leaders, to fully understand their obligations under DAOD 9004-1 and FSG 1400-02 to maintain operational integrity and ensure the safety of all members

Together, we uphold the RCAF's legacy of excellence and commitment to safeguarding Canada's skies. Through ongoing education, collaboration with healthcare professionals, and adherence to our regulatory frameworks, we navigate the complexities of cannabis use with diligence and dedication.

The Trouble with Norms

by Col (Retd) Chris Shelley

As humans we regulate our behaviour constantly based on norms. Norms are the social rules that mark out what is appropriate, allowed, required, or forbidden in different situations, as compared against others of our reference groups. Norms persist when members of the group believe that other members will behave in ways consistent with the norms and that the group members believe such behaviour is acceptable and proper. Norms are functional where they help us to behave appropriately in diverse situations without having to think too much. In a way, they are like an autopilot for our behaviour, helping us to navigate our daily routines without having to calculate constantly what we ought to do in every situation. However, just as autopilots can sometimes lead us down the garden path to trouble, so can norms.

Norms are dysfunctional when adherence to the norm creates outcomes inappropriate to the situation, outcomes inconsistent with health and safety. Normative behaviour usually puts us on track to safe and effective flight operations, but sometimes a situation arises where violating a norm would be safer, where being counter-normative would lead to a better outcome. However, acting counter to norms is not free. There can be a social cost: the disapproval of others in our reference group. Norms are powerful, and people hesitate to break them.

For example, imagine a group of people at dinner in an upscale restaurant. Suddenly, the fire alarm sounds. At some level everyone realizes the safest course of action would be to rise from the table immediately and leave by the nearest exit. Yet firefighters will tell you that most people will remain at their tables until someone in authority directs them to leave. This is because leaving immediately violates several social norms. Some will follow the norm of seeking more information before leaving so as not to appear foolish. Some will follow the norm of not spreading fear or panic by moving too quickly. Some will be reluctant to leave without paying the bill, since violating that norm might put them in a bad light. All who ignore the alarm risk death or injury should the fire be real, yet that risk is less salient in the moment than the risk of censure for having violated the normative behaviour expected of diners.

Two historic accidents can show how adherence to norms can sometimes lead us astray. In 1946 the RCAF lost two C-47 Dakota transport aircraft, with all crew and passengers, in two unrelated accidents. Although there are large gaps in our knowledge of these occurrences, there is enough evidence to conclude that adherence to social norms played a role in dissuading people from actions that might have prevented these accidents or reduced their severity. Let's take a closer look!

The first accident occurred in January 1946 and cost seven lives. The second occurred in September 1946, taking twenty-one lives, and remains the RCAF's worst peacetime accident. Both aircraft belonged to units of No. 2 Air Command, and both occurred during a period where the RCAF was transitioning from wartime to peacetime structures.

In late December 1945, No. 6 Operational Training Unit (OTU) for C-47 Dakota aircraft was ordered to relocate from Comox, B.C. to Greenwood, N.S. in January 1946. As part of the move, the occurrence aircraft, a C-47 Dakota Mk. III, was tasked to carry a load of freight, mainly aircraft jacks and ground handling equipment, with three crew and four RCAF passengers from Comox to Greenwood. The aircraft took off at 2358 hours Pacific Standard Time 18 January 1946 to fly from Comox to Vancouver and then airways via Cranbrook to Winnipeg. Weather was forecast to be intermittent clouds topped at 16,000 feet, light icing, moderate turbulence, and strong winds. The weather conditions were expected to improve as the aircraft transited east of the Rocky Mountains. The pilot made a radio report with Cranbrook Radio Range at 0224 hours, stating that the aircraft was flying in cloud at 11,000 feet. No further communications were received, and the Dakota was declared missing. An intensive air search was carried out, without result until forest rangers discovered the wreckage at the 7,000-foot level of Mt. Ptolemy, AB on 23 January 1946. All crew and passengers had suffered fatal injuries on impact, which was followed by a fire. Investigators did not reach the crash site until 29 January due to its remote location and severe weather conditions.

Photo: Canadian Warplane heritage museum

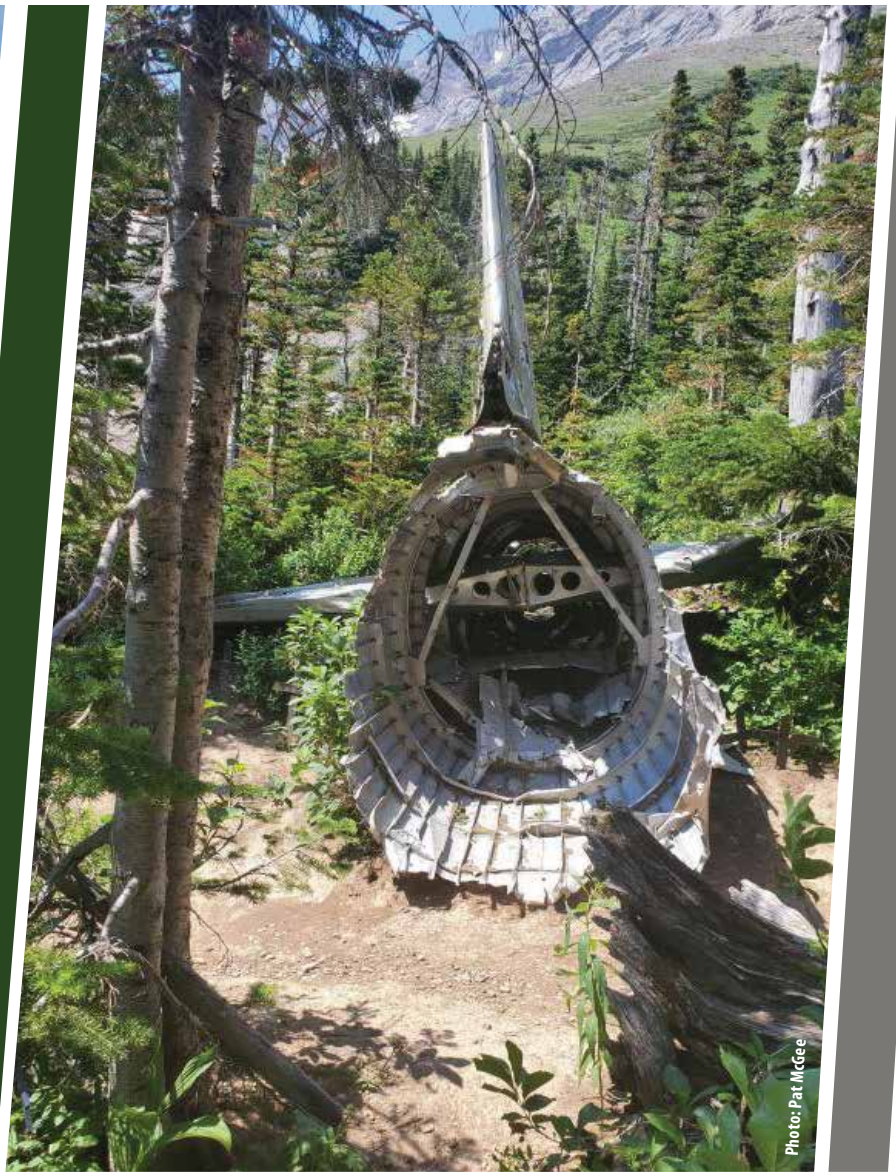

Photo: Pat McGee

No. 2 Air Command Headquarters, Winnipeg, convened an investigation on 24 January 1946 in Lethbridge, AB. A Flight Lieutenant (Captain) was assigned as Investigating Officer (IO). The IO was aided by the Inspector of Accidents, No. 2 Air Command, a very experienced Wing Commander (Lieutenant-Colonel), who visited the crash site to gather evidence. The investigation was hampered by the remote location of the crash site, the severity of the weather, and the move of the OTU to Greenwood during the search, making access to witnesses and documents difficult for the Lethbridge-based investigation.

Inspection of the crash site revealed that the aircraft had suffered a failure of the starboard engine, although the failure mechanism could not be determined. The aircraft was a Dakota Mk III equipped with a single-stage supercharger on each engine. The best obtainable single engine ceiling for an aircraft so equipped was 6000 feet above sea level (ASL) at the maximum permissible gross weight of 29,000 pounds in ideal conditions. The aircraft captain had told the unit dispatcher the aircraft was overloaded at 31,000 pounds and some cargo would have to be unloaded. The IO was unable to determine if this had been done. Further, Comox lacked scales to weigh cargo, therefore loads had been estimated based on tare weights, and were likely inaccurate.

The investigation found that the Dakota was probably overloaded when it took off, and that its single-engine ceiling had been no greater than 6000 feet ASL at the time of the occurrence and could have been reduced further by propellor icing. The pilot had been unable to maintain terrain clearance in the dark after the engine failure and the aircraft crashed.

The aircraft captain of a Dakota Mk IV that had preceded the occurrence aircraft testified that intermittent wing and propellor icing had been encountered in cloud when flying the same route approximately one hour earlier at 11,000 feet. De-icing capabilities of the aircraft had not been sufficient to prevent a build-up of ice. This Dakota Mk IV was equipped with two-stage superchargers, and the pilot employed these at cruise altitude to ensure reserve power in the case of an engine failure. The single-engine ceiling of an aircraft equipped with a two-stage supercharger was

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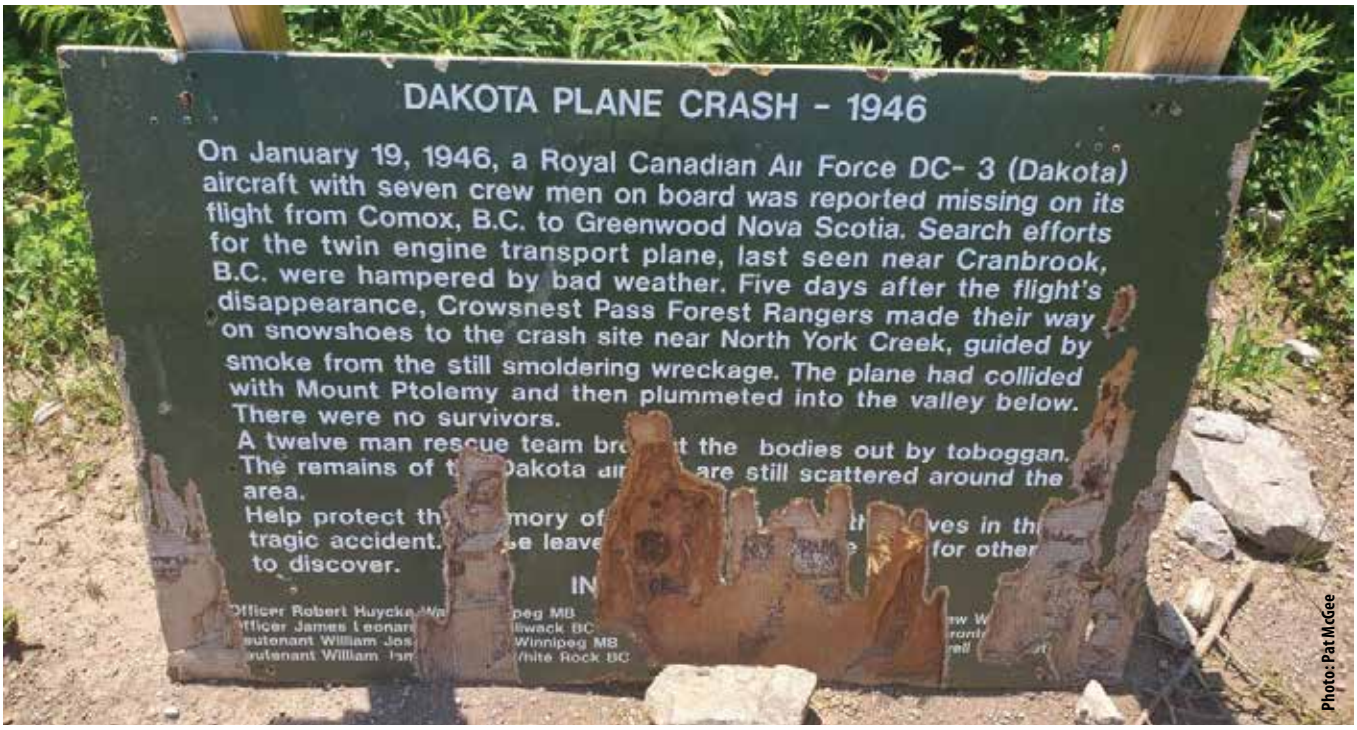


at least 7500 feet at max gross weight of 29,000 pounds, which gave a greater margin of safety than the single-stage supercharger along this route. This aircraft encountered no problems and landed at Winnipeg without incident.

The investigation found numerous issues but the significant point for this account is that the OTU had issued a movement order tasking a Dakota Mk III to fly across mountainous terrain at night at maximum load in conditions where a single engine failure would leave it unable to maintain ground clearance. In-flight engine failures or shutdowns had a frequency of about one per 500 flying hours on the C-47 in this era, so the risk was far from theoretical. The aircraft captain had expressed concern about the overload, yet even had the gross weight been reduced to 29,000 pounds an engine failure could have led to a serious accident, as indeed it did.

Examining the behavioural norms at work may shed some light on why the pilot accepted a movement order that increased the risk of a routine transport tasking instead of requesting an amendment.

The pilot had flown combat operations in Europe on twin-engine bombers in the maritime attack role before being posted back to Canada as an instructor on the Dakota OTU. The pilot had been awarded a Distinguished Flying Cross recently due to excellent combat performance. As an OTU instructor the pilot had been assessed as consistently above average or outstanding. In short, this pilot was very experienced and competent.

It would have been normative for this combat veteran to accept missions with elevated risk levels. When the pilot attempted to reduce the aircraft load to 29,000 pounds, it appeared the motivation was to preserve the 6000-foot single-engine ceiling of the Dakota. That this was inadequate to preserve terrain clearance over much of the first leg of the route did not appear to be a concern, as the pilot never asked to amend the movement order. Neither did the investigation conclude the pilot ought to have asked for such an amendment. Rather, the IO faulted only the unit for tasking a night transit for this Dakota Mk III when there was no operational necessity. Clearly, neither the occurrence pilot nor the IO conceived of a norm where pilots suggested amendments to orders issued from higher. The RCAF was clearly still in a wartime frame of mind in that respect.

Another factor affecting the behaviour of RCAF personnel in early 1946 was change. The RCAF was demobilizing rapidly, shedding personnel, equipment, and infrastructure. Its future configuration had yet to be established. Aircrew wanting to stay in the RCAF competed for relatively few positions in the "Interim Air Force." Even aircrew who had been granted peacetime terms of service may have been wary of questioning authority, given that the "Interim Air Force" was just a waystation on the road to a permanent RCAF of unknown size. A behavioural norm of "not rocking the boat" prevailed, making it less likely that an aircraft captain would question superiors about the wisdom of a movement order. The risk of being perceived poorly might have outweighed the risk of a possible, but unlikely, engine failure in the mind of the pilot. In the final analysis, the two norms of routinely

accepting unnecessary risk and not rocking the boat helped set-up this accident.

The second Dakota accident occurred on 15 September 1946 at Estevan, SK. At 1015 hours a Dakota Mk III carrying three crew members and 18 RCAF ferry pilots stalled while approaching the approach end of runway 36 at Estevan and crashed. All aboard suffered fatal injuries. Witnesses described the Dakota approaching the threshold at 75 feet above ground, with the wheels down and half-flap. The aircraft climbed suddenly, then levelled off briefly. This was followed by a second climb, in which the landing gear was retracted, and the Dakota reached an extreme nose-up attitude at about 300 to 500 feet above ground. The aircraft then stalled, fell off on the port wing and plunged to the ground. The bodies of crew and passengers were thrown clear of the wreckage by the impact. A post-crash fire destroyed most of the fuselage. Personnel responding to the crash found that the starboard elevator control lock was still in place.

The occurrence Dakota belonged to 124 Ferry Squadron. This unit existed to return Lend-Lease aircraft to the United States, in this case ferrying Cornell trainers from Estevan to Fargo, North Dakota (N.D.). The aircraft captain had been authorized by squadron headquarters in Winnipeg to carry out multiple trips as needed to pick up the ferry pilots in Fargo and return them to Estevan. As Fargo, N.D. was a bleak US Army Air Force station, the ferry pilots decided to spend the night in Minot, N.D. where there was more entertainment. Thus, the occurrence Dakota had picked up the pilots in Fargo and remained overnight in Minot, leaving only the short final leg for the next morning.

The Court of Inquiry focused almost exclusively on determining who was to blame for leaving the control lock in place on that final leg. Consideration of what we today know as Human Factors was completely absent from the proceedings. The Court, consisting of a Wing Commander and two Squadron Leaders (Lieutenant-Colonel and Majors), looked solely at the final leg from Minot to Estevan, without examining operational planning, or speculating on the crew's actions. With no survivors, no radio transmissions, no onboard recordings, and precious little wreckage after the post-crash fire, the Court had scant evidence. It could not even determine who had been at the controls or who had occupied which seat at the time of the crash. The only person whose role was certain was the enlisted crewmember. This individual was normally tasked with removing control locks, but clearly one lock had been left in place.

There was no doubt but that the aircraft captain (the authorized one, not the one named on the flight plan) was ultimately responsible by RCAF regulations for ensuring the elevator control lock was removed before flight. The Court took the charitable view that the crew had not known the elevators were locked until they attempted the approach at Estevan. This meant that neither a proper walk-around nor a control check had been conducted prior to take off. The Court asserted that the pilot had not used elevator trim at all during the 45-minute flight, until on final approach at Estevan the pilot had trimmed the aircraft nose-down to minimize the chance of porpoising on touch down. This conclusion was supported by the trim tab being found full nose down post-crash. The elevator being locked, the trim tab acted as a mini-elevator and caused the Dakota's nose to rise suddenly and gain altitude. The pilot's immediate reaction must have been to trim even further nose down, worsening the situation, and causing the second nose-up event. The landing gear was retracted at this point, but the stall and crash could not be avoided. The Court found the aircraft captain to blame for the accident, as that person was responsible by RCAF orders for the safe execution of the flight, which included ensuring that proper ground and pre-flight checks were carried out. The Court recommended that a rack for control locks be placed in the aircraft radio compartment so that the crew could readily ascertain that they had been removed prior to take-off.

In terms of normative behaviour, this occurrence presents some interesting observations. The first one is that not only the three crew, but 18 very experienced RCAF pilots managed to board the aircraft without anyone noticing that the starboard elevator lock was still in place. The crew's performance discrepancy has already been noted. But what about the pilot/passengers?

The passengers, despite being pilots, displayed the normative behaviours of passengers, not aircrew. They boarded through the port door aft of the wing. The port elevator lock, the one most visible to passengers, had been removed, so there was no reason to suspect the starboard elevator lock was still in place. These pilots adhered to the passenger norm of assuming the crew had carried out its duties, (it hadn't), and to the norm that it wasn't their place as passengers to double-check the crew (which it wasn't). The third norm would be that of professional courtesy. As aircrew, it might be thought insulting to double-check the Dakota crew's walkaround, as if to imply they weren't to be trusted (which they weren't). This norm would have been even stronger since crew and passengers were all members of the same squadron, so the social cost of counter-normative behaviour would have been higher. Yet had even one of the ferry pilots decided to act counter to the norms by taking a quick glance around the tail at the starboard side of the aircraft, the starboard elevator lock could well have been discovered and removed. Embarrassment would have resulted, instead of a disaster. Yet, for the reasons discussed, humans find it very difficult to act contrary to norms in most situations, so the pilot passengers ought not to be faulted.

The second observation is that no one parachuted from the aircraft. Why? The ferry pilots all had parachutes, in their accessible baggage, as did the crew. Everyone could have abandoned the aircraft in flight rather than attempt a landing with locked elevators.

Continued on next page

The Court concluded that because no one parachuted from the aircraft, the crew must have been unaware of the locked elevators until the final approach. To the Court, this was the only logical explanation. Moreover, the passengers were not wearing seatbelts at the time of the crash. The Court made no comment on this, yet it deserves a second look through the lens of normative behaviour.

It is almost certain the crew became aware of the locked elevators during the take-off roll when it was too late to abort. The Dakota was loaded heavily enough that forward pressure on the yoke would have been applied to raise the tail during the take-off. When it was found that the yoke would not move the only option would have been to maintain take-off power and allow the aircraft tail to come up on its own and fly off, as the Dakota was designed to do.

Once airborne, the aircraft captain faced a dilemma. A quick check of the control lock inventory would have shown that the starboard elevator was locked. The aircraft captain might have been motivated to find a way to land safely without revealing the egregious, potentially career-ending, mistake that had occurred. If a safe landing could be achieved, then the offending control lock might be removed with no one being the wiser. This might seem far-fetched, but it would explain why Estevan was not notified of the control issue by radio so that crash/rescue equipment, which had to be summoned from the town, could stand by. It also explains why the aircraft was not abandoned in flight, since someone was bound to notice a trail of parachutes over southern Saskatchewan followed by a crashed Dakota.

One solution would be to use the passengers to trim the aircraft in the lateral axis during the approach. Anyone familiar with the Dakota will know that moving passengers fore and aft will affect the pitch, so it would have been possible to adjust trim by shuffling the 18 passengers around to set the aircraft up for a stable approach. This would have required undoing the seatbelts to facilitate movement in the crowded cabin. Once over the threshold, the throttles could be closed, and the aircraft would settle onto the runway as airspeed decreased.

Plausible? All aboard were squadron mates. There was a flat authority gradient since no one held a higher rank than the aircraft captain, a Flight Lieutenant. Thus, they would have appreciated the predicament of the aircraft captain and would be influenced by two norms. The first was to accept the authority of the aircraft captain to decide on a course of action that had a chance of success. The second was to help a comrade out of a sticky situation if possible. Both norms suggest that the aircrew passengers would have complied with the aircraft captain's plan of landing with the locked elevator, using passenger movement to trim the aircraft. For someone to have donned a parachute and jump would have been extremely counter-normative behaviour, so it is understandable that no one did so. In a similar vein, the Titanic launched half-empty lifeboats initially, because the norm was that women and children went first. Men stood by, unwilling to break that norm and endure the shame of being thought a coward, on the faint hope that a rescue ship would appear before they drowned. Such is the power of a norm!

As the Dakota approached Estevan, everything went fine until the pilot attempted to set nose down trim on final as per a normal approach. That caused a sudden pitch up, and the passengers, being unsecured, shifted aft enough to cause the final loss of control and fatal crash. It is plausible that this situation was created by the social power of norms that led the crew and aircrew passengers of this aircraft to comply with a course of action that promised a safe and consequence-free termination to the emergency created by the locked elevator rather than a less risky but more embarrassing alternative of abandoning the aircraft in flight. Whether this was in fact the case, we will never know.

Norms! These two accidents show us how normative behaviour can be dysfunctional, contributing to unwelcome outcomes. Like a behavioural autopilot, norms guide us through our daily life, smoothing our social interactions and reducing our psychological workload as we navigate interactions with our peers. Sometimes, like an autopilot in the wrong mode, they can lead us unknowingly into trouble, allowing us to stifle the qualms we ought to feel about embarking on a course of action that might be risky or even dangerous. When it comes time that you feel the hairs on the back of your neck stand up, that something isn't right, take a breath and consider whether it is time to act counter to the norm, to break away from the crowd. Think about the norms you are following, to where they are leading you, and check six!

Colonel (Retired) Chris Shelley, C.D.

Chris Shelley joined the Canadian Forces in 1973. After graduation from Royal Military College he trained as a pilot, flying some 3 800 hours with 424 Squadron and 408 Squadron on CH135 and CH146 aircraft. He flew on operational deployments in Central America (1990) and Bosnia (2001). He commanded 408 Squadron and 1 Wing before serving as Director of Flight Safety from 2006 to 2008. Retired since 2008, Chris retains a lively interest in aviation history and flight safety.

For Professionalism

For Commendable Performance in Flight Safety

Corporal Louis-Philippe Cyr

On 5 April 2024, Cpl Cyr was assigned the critical task of retorquing the wing attachment bolts on the CC130J aircraft. This maintenance procedure, carried out every 600 airframe hours, involves torquing 13 lower bolts and 11 upper bolts to 200 ft/lbs and 230 ft/lbs, respectively. This procedure is essential for extending the service life of the wing and ensuring its secure attachment to the aircraft.

While executing his duties, Cpl Cyr went above and beyond his immediate responsibilities and reviewed the maintenance records of the previous night shift's work on a separate aircraft. He discovered that the night shift had failed to defuel the aircraft before performing the torquing procedure, compromising both safety and service life of the aircraft since defueling is necessary to alleviate stress on the wing attachment bolts and ensure accurate torque readings.

Thanks to Cpl Cyr's vigilance, the aircraft was not certified for flight with the compromised torque values, which prevented premature wing fatigue and significant safety risks. Cpl Cyr's exemplary conduct underscores the importance of vigilance and attention to detail in aviation maintenance and is a reminder that safety is a collective responsibility. For these reasons, Cpl Cyr is very deserving of the *For Professionalism* Award.

Photo: Avr Julia MacLeod

DOSSIER

After the Scare

Re-Print From Flight Comment Issue 2001-4

by Capt Clavet, Flight Surgeon

Photo: Air Task Force

How many of you have found yourselves in sudden, terrifying danger? How did you react? And, to the point of this article, how did that situation and your reaction to it affect your attitude and decision-making immediately after the event? The two following flight incidents might be instructive!

The first potentially catastrophic situation involved a CC130 Hercules and four crew members. It was the early 1990's during the first half hour of a three-hour training session in the local circuit pattern. During a practice "maximum effort take-off," at the very limit of the flight envelope, a safe three-engine airspeed barely achieved, and the aircraft attitude very nose-high, the #1 engine was very abruptly brought back to the idle position to simulate an engine failure. Immediately, the aircraft rolled sharply left and pitched down towards the water, despite corrective actions taken by both pilots. Since the aircraft did not seem to be responding to their inputs, the crew all thought that it had incurred structural damage. They expected to die, an opinion shared by eyewitnesses on the ground. But a few feet above the water, they regained control, and flew away to their relief... but continued with the three hour training session, despite almost kissing their lives goodbye.

Ten years later another training mission involved Dissimilar Aircraft Combat Tactics (DACT) between CF18's and American F-16's. During the first engagement, after a succession of errors and miscues, lead and #2 almost collided. The nightmare was avoided by an aggressive evasive maneuver from #2, initiated at the very last second before impact. The miss distance between the two aircraft was estimated, from the tapes, at only a few feet. The two pilots both knew how close they came to dying, and several hours after the flight, they were still in a daze; the emotional results of the near catastrophe were plainly evident on their faces... but after the near disastrous first engagement, they kept pushing the training session and repositioned for the following engagements.

Two different situations, but the same decision to carry on with the training, despite the mind-numbing adrenaline flow that had just been experienced. There are physical, cognitive, and emotional changes that can come into play immediately after critical incidents such as these: fatigue, nausea, dizziness, difficulty breathing, visual difficulties, confusion, poor attention, poor orientation, poor decision making, poor concentration, poor problem-solving, anxiety, denial, fear, uncertainty, apprehension, and agitation (to name a few!). Would someone plan a mission and go flying in these circumstances? So why continue flying once they manifest?

The answer is that a defense mechanism is at work, one the human brain uses to relieve the anxiety and stress in order to "cope" and keep going. It is known as "affective isolation," or the separation of an experience from the affect or emotion that accompanied it. In other words, the brain "forgets", isolating the feelings just experienced (the more critical, life threatening, and frightening the event, the more effective the process), leaving them to be retrieved, if need be, later on, but in the meantime to keep pushing. And it is done unconsciously! The problem is that while the brain does this little trick, the physical, cognitive, and emotional impairment is still affecting performance.

The decision to press on after the scare, especially in a training mission, could precipitate the same results so recently averted!

Editor's note:
Mental toughness isn't blindly pushing on in the face of adversity but rather it is making tough calls to recognize that we humans have limitations and that a debrief on the ground might be the better way to proceed.

Photo: Cpl Ian Thompson

For Professionalism

For Commendable Performance in Flight Safety

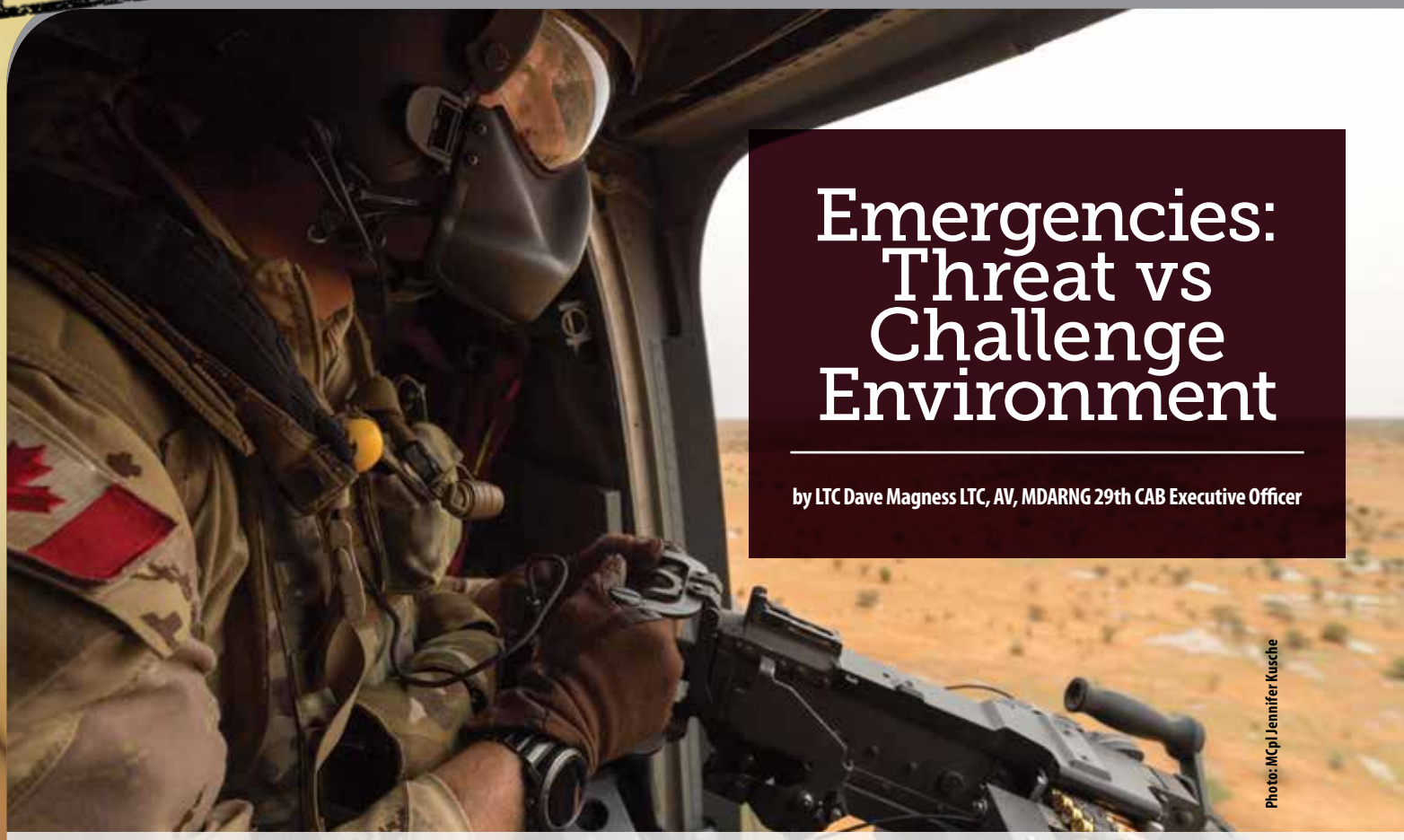
Corporal Michael McNutt

Photo: Cpl Lyndsay Brolly

On 8 April, 2024, Cpl McNutt, an AVN level A technician, was conducting maintenance on a CP140 aircraft for an Emergency Brake Overboard Discharge (EBOD) line replacement; when he removed a floorboard to gain access to the line, he noticed an oddity with one of the trim cables. There are four trim cables, which run forward to aft in parallel along the length of the fuselage, and what Cpl McNutt noticed was one of these cables was not parallel with the other three. Cpl McNutt needed to remove additional floorboards to investigate further. Once that was complete, he found one of the rudder trim cables had been routed incorrectly underneath and perpendicular to the other flight control cables and around the exterior of an adjacent Elevator Trim pulley, rubbing on the pulley mounting bracket. The system was quarantined, inspected and then re-routed correctly.

It is possible this error could have gone undetected until the next Periodic Inspection, which is at 1000 hours flight time, and plenty of time to have major rubbing and extensive damage to the cable. The member's keen observation while conducting unrelated maintenance directly contributed to the prevention of a potential loss of aviation resources and personnel. Cpl McNutt displayed a high degree of professionalism and situational awareness and is therefore most deserving of the *For Professionalism* Award.

DOSSIER



Emergencies: Threat vs Challenge Environment

by LTC Dave Magness LTC, AV, MDARNG 29th CAB Executive Officer

Photo: MCpl Jennifer Kusche

Op-ed, Opinions, Ideas, and Information (Views expressed are to generate professional discussion and are not U.S. Army or USACRC policy)

Crew members in an emergency react in two ways: those who perceive a challenge and those who feel threatened. It becomes essential for leaders and instructors to identify crew members who naturally lean towards seeing every event as a challenge and find means to nurture this perception in others. Toxic environments at home, work, or in the aircraft can reduce crew effectiveness. The lack of situational awareness can further exacerbate their circumstances. This article will discuss indicators, what leaders can do, and what soldiers and crew members can do to gain a competitive edge in dealing with emergencies and avoid perceiving themselves in a threatening environment.

When human beings feel they are in a high-adrenaline threat environment, there are several behavioral and physiological reactions. In the world of aircraft accident investigations, there is a consistent indicator of helicopter pilots slowing their aircraft and starting a gentle left turn when entering a threat environment. This is especially evident when pilots inadvertently enter instrument meteorological conditions (IMC). This is simply because pilots are human beings. Our natural inclination, regardless of how tough a person is, is to enter the fetal position. This physically materializes as an instinctive pilot reaction of the right hand pulling back and to the left. The Alaska Department of Public Safety N911AA A350 accident is an exaggerated example of this scenario. In 2013, N911AA performed a night vision goggle (NVG) rescue just northeast of Talkeetna, Alaska. Low ceilings and low visibility resulted in the Eurocopter inadvertently entering IMC conditions. The helicopter had an inoperative turn coordinator, and the attitude indicator was not rated for instrument flight rules (IFR). The pilot entered an initially gentle decelerating left turn that progressively worsened until the non-IFR attitude indicator began to tumble. In a last-ditch effort to regain aircraft control, the pilot attempted to re-cage the attitude indicator, resulting in a false horizon, and the helicopter flying into the terrain.

In a 2014 journal article named 'Individual Reactions to Stress Predict Performance During a Critical Aviation Incident,' researchers studied pilot eye movement and overall emergency reaction during perceived threat and challenge environments. Pilots that felt they were in a challenging environment demonstrated a good scan of their instrumentation and simulated visual cues. Pilots that felt they were in a threat environment

demonstrated poor scanning techniques. These pilots would either have an erratic scan or would become fixated and fascinated on one specific instrument. An instructor pilot (IP) graded pilot emergency procedure reactions and found that when they perceived themselves to be in a challenging environment, they performed better than those who perceived themselves to be in a threatening environment. In an emergency threat environment, human beings enter fight, flight, or freeze conditions. In all three, cognitive reasoning is significantly diminished as blood is pushed to a person's extremities. In a helicopter, this becomes somewhat counterproductive as crew members need higher reasoning more than they need their muscles in their arms and legs to hit or run. Not only do average people have a harder time thinking through complex problems, but their physical responses may result in overcontrolling the aircraft or even result in uncontrollable shaking.

In short, crew members find themselves operating at less than their peak cognitive performance when entering a threatening environment. At the individual level, it becomes essential to create automatic psychomotor functions. The first step in this process is rote memorization of emergency procedures. The most important being RAASH: rotor, attitude, altitude, speed, and heading (fly the aircraft). The goal of RAASH is to enter steady state conditions to enable the crew to correctly diagnose and execute an emergency procedure. The typical best place to enter steady state conditions is on the ground, but each situation is different. If in the air, pilots must ensure rotor revolutions per minute (RRPM) or NR is in normal operating ranges (green). Attitude becomes essential to overcome a pilot's natural threat reaction to simultaneously turn left and decelerate. Altitude and speed are stored potential energy that can be used to maintain or regain RRPM. Both altitude and heading are necessary to move away from hazards. Speed, if incorrectly used, may result in further exacerbating the problem resulting in additional damage, such as generating or bleeding too much RRPM/NR prior to autorotation cushion. The RAASH acronym is designed to maintain aircraft control. Training pilots in rote memorization and then realistic practice in the simulator and aircraft generates psychomotor skills that improve survivability.

The use of crew coordination takes this to the next step and is essential to compensate for individual pilots that may be entering the fetal position, conducting poor scanning techniques, and/or having their cognitive higher functions being suddenly and rapidly decreased. It becomes essential for the second pilot to assist the pilot on the controls by calling out rotor, attitude (trim ball), altitude, speed, and heading to break through the excitement generated by the threat fog of an emergency. Crew-served platforms, such as machine guns, tanks, artillery, and helicopters, have a distinct advantage in emergencies. This advantage is the team mindset that gives specific duties to individuals. This includes the potential for an aircrew member to become dissociated from the immediate situation, allowing them to maintain an unimpassioned perspective and maintain higher cognitive reasoning/thinking. LTC (RET) David Grossman (1995) identified in "On Killing" that teams such as artillery crews showed minimal degradation of their abilities when exposed to the fight, flight, or freeze scenario as individuals not only relied on others but were encouraged not to fail their team. In addition, this enabled crew members to disassociate duties and responsibilities. Individuals monitored their teammates' performance. This team interaction not only corrected errors before they became mistakes but also improved an individual's cognitive thinking and improved their resiliency in meeting harsh demands.

When in steady-state conditions, the person not on the flight controls can begin diagnosing the emergency using the checklist. The checklist is a tool for crew members to become neutral and return to normal cognitive thinking. Additional crew members, normally associated with UH-60 and CH-47 aircraft, can both back up the checklist, ensuring proper diagnosis, but also maintain airspace surveillance or even make emergency calls if needed. By offering and directing assistance, crew workload decreases, dispassionate cognitive thinking improves, and errors decrease. Remember—Fight, flight, or freeze conditions associated with threat conditions lower individual performance. Rote memorization of emergency procedures, specifically RAASH, is fundamental in psychomotor skills, scanning techniques, and overall maintaining aircraft control. The use of crew coordination elements to offer and direct assistance further reduces crew workload, improves cognitive awareness, and reduces the chance of a catastrophic accident.

Photo: Cpl Vic Lefrancois

For Professionalism

For Commendable Performance in Flight Safety

Mr. Patrick Lavoie

Photo: Keith Kelly

On 19 March 2024, while working on a CT120 Grob (C-FPFW), Mr. Patrick Lavoie discovered a defect completely unrelated to the one he was repairing. As he was changing the vacuum pump, something did not seem right about one of the upper engine mounts. Patrick thought he could see a slight gap between the mount and the engine pad which led him to check the nuts by hand, at which point he discovered that one was just finger tight. He continued inspecting the remaining hardware with a wrench and found both upper engine mounts loose. Patrick notified maintenance management immediately and filed a Flight Safety report. Mr. Lavoie's professionalism and attention to detail demonstrate an elevated level of safety-mindedness.

Mr. Lavoie's extra effort is commendable and worthy of this *For Professionalism* award.

For Professionalism

For Commendable Performance in Flight Safety

Mr. Vincent Bélanger-Savard

On 1 March 2024, Mr. Vincent Bélanger-Savard participated in the installation of a rear ejection seat that was previously removed for maintenance on a CF188 aircraft. Mr. Bélanger-Savard noted a larger gap between the fitting nut of a shielded mild detonating cord and a one-way transfer valve attached to the aft bulkhead of the cockpit. The gap was measured to be about 0.016 inches. Although the fitting nut was secure with a lockwire, the technician made the decision to check the tightening torque which was found to be largely under the torque requested in the technical documentation.

Photo: André Bernier

This discovery triggered an exhaustive inspection of the 48 lines of shielded mild detonating cord which included removing several parts of the aircraft's interior. According to the results of the survey, 46 of the 48 lines were under the required torque. A visual inspection was carried out on each poorly tightened line, revealing that there were five lines to replace. The shielded mild detonating cords are responsible for connecting various ejection components of the cockpit. This includes the canopy ejection controls and the two ejection seats. A failure of the system could have resulted in pilot or canopy ejection malfunction.

Mr. Vincent Bélanger-Savard was very attentive and managed to capture a situation which could have had serious and potentially catastrophic consequences. Mr Bélanger-Savard's demonstration of professionalism and commitment to safety of flight embodies the Flight Safety Program. For these reasons, he is very deserving of the *For Professionalism* Award.

DOSSIER

STUDENT DEMOS

by Mr. Keith Kelly

A posting to Portage la Prairie as a flight instructor can arguably be one of the best postings – hear me out; you get to fly every day, building hours, consistently honing manoeuvres you might not otherwise practice regularly. Most importantly, you are teaching and mentoring the future pilots of the RCAF! Your guidance can have a huge impact on what they choose or don't choose to fly as a career. Especially if you really love your job and the flying that comes with it, you will want to promote that lifestyle to your student to motivate them! Though as much as you are enjoying this type of flying, you aspire to return to operational flying. You want to maintain proficiency in manoeuvres you flew while on squadron, but how can you do this?

Imagine this scenario: you've just completed a mission with your student in the training area, and it's time to head back to base. You take control to show your student some tactical flying to motivate them. You drop down to tree-top level and follow the bends and twists of the river as you fly back to base. Of course, your student is going to think this is really cool, and you are a great instructor! You are trained for this sort of flying and may have done so operationally. You know what to watch for and what to be ready for. You are very familiar with this stretch of river and know where the bridges and power lines cross. But what about your student? Have they considered the risks of power lines and bridges? Probably not. They are busy enjoying the cool ride. Has your student considered what would happen if a bird flew through the windscreen right now? Nope. Probably still enjoying the cool ride. Has your student considered what to do if an engine failure or power loss was to occur? Probably not. They are still too busy enjoying the ride and marveling at your skills as a pilot.

Then the day arrives, your student is going solo! They remembered that demo and decide it would be fun to play Tac Hel pilot while flying back to base. Four feet off the river, cruising along, having a good time. They then climb to tree-top height, but in doing so, cause an over-torque due to their handling of the controls. On realizing that the Flight Safety Officer is going to request permission from DFS to view the video to determine what caused the over-torque, the student confesses what they had done. In case you may think this sounds a little farfetched, you can refer to FSIMS 187574.

Both BGA 100 and Flight Operating Manuals have strict regulations on low flying as well as each Wing, Flying Training schools in particular do not permit low flying or "tree top" type flying for safety reasons. Those are the rules, but what about the risks?

Transport Canada also takes low flying seriously. They put out a brochure called "Take Five". One is titled "Low-Flying Exam". It asks nine questions, among them are:

- How much more space do you need in a turn with a 20 kt tailwind?
- How far away can you see a wire?
- If you must climb abruptly to miss a wire how much space will it take until the aircraft starts to climb and what airspeed will you have after 300'?
- Will your windshield stand up to a 3-lb. gull?

When it comes to teaching someone to fly, we know that we need to teach it right the first time. If we give a poor explanation and/or demonstration, the student will have the wrong idea about what we are trying to teach them. For example, think about teaching someone how to perform a loop. We stress what the entry speed and G's need to be. Where the student should be looking throughout the manoeuvre. We go over common errors and how to correct them when/if they are encountered. We make sure the student knows the minimum recovery altitude and thinks about what a good starting altitude will be. If the demo for the student does not go as planned – wing drop on entry for example –

we would acknowledge this and provide a second demonstration to ensure the student understands what is expected.

As instructors, we frequently fly in the same, routine training areas. We get to know those areas well. We know where the hazards are and where to safely practice the exercises we intend to teach on any given mission. But our students don't. We ensure the students know about what to watch for in the various training areas and where the hazards are for the exercises they are permitted to fly solo so they can proceed safely. However, we also expect them to follow the rules and procedures and only conduct the exercises we are sending them out to practice. But what example are we setting if we do things that are not permitted in the flying orders for fun?

One day, when you are posted back to an operational unit, you will go through a refresher to get yourself back up to speed on the manoeuvres and tactics that will be expected of you. Until then, be the best instructor you can be, for your student, and sleep well knowing you kept them safe by teaching them the right way.

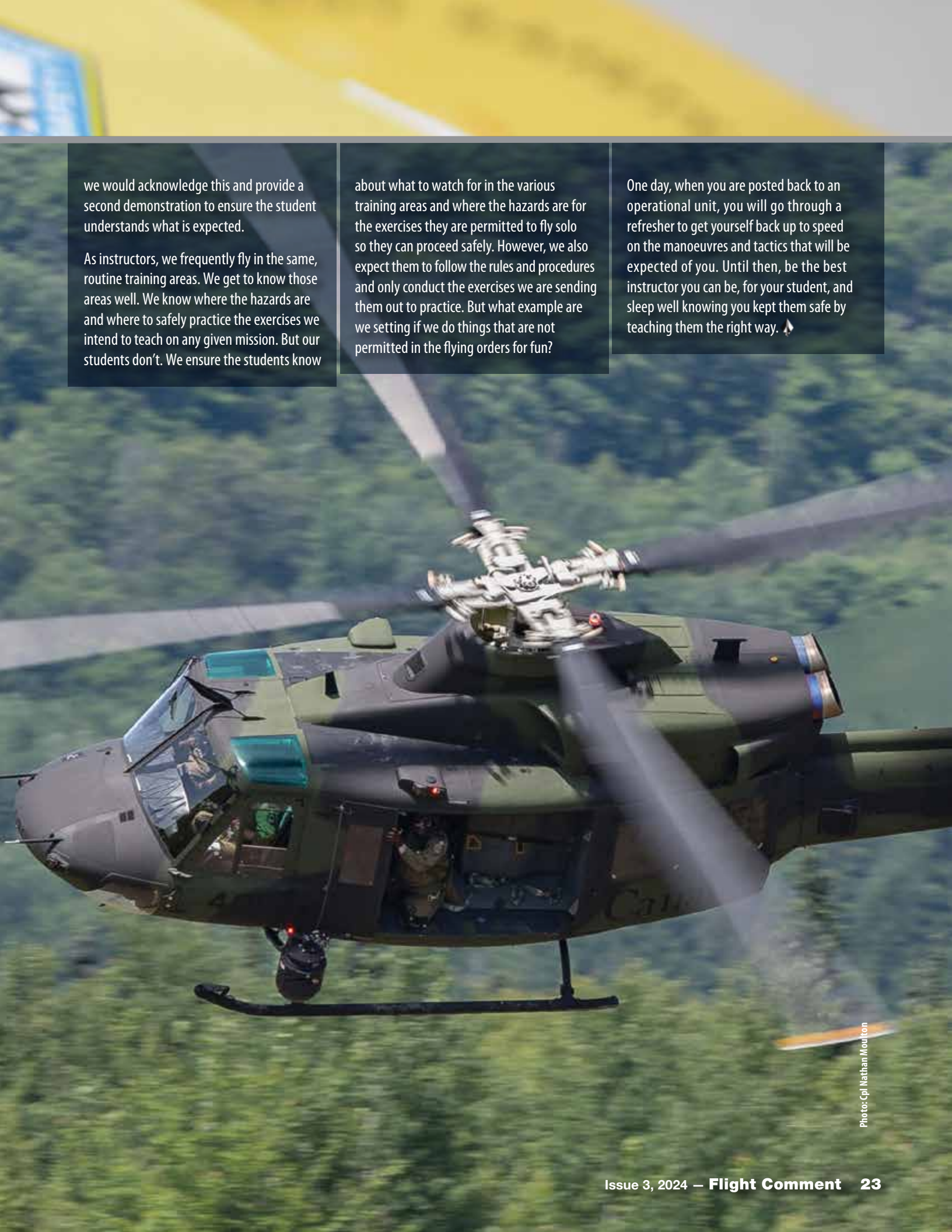


Photo: Cpl Nathan Moulton

Photo: Cpl Patrick Blanchard

Transforming the Night Sky

by Maj Christian Hirt (CC177 Pilot)

In the aviation industry, fatigue poses a significant risk to pilots and other professionals due to long-hours, irregular sleep patterns, and high workloads. As an experienced CC177 pilot, I have encountered several instances when fatigue management was crucial to mission success. I would like to share one story, when fatigue posed a significant challenge to my crew.

Our six day adventure was in support of Op Impact and by the time we crossed the Pakistani - Afghan border, we were already suffering from fatigue. Getting ready for our approach into Kabul, I was well positioned, sitting in the smart-seat as the instructor pilot so I could diligently follow through all the actions of the flying crew. I observed the crew correctly setting up the Counter Measure Dispensing System (CMDS) as per the Combat Ready Checklist. However, the CMDS counter display was corrupted and required a quick reset which was not uncommon. I elected to wait for an opportune time to highlight the issue since the workload was ramping up as we approached our destination. After a quick verbal exchange, the Aircraft Captain (AC) candidate instructed the co-pilot to reset the kit. Rudimentary in nature, but when you add low ambient lighting, NVGs, noise, foreign ATC and fatigue into the mix, you have a "Flight Safety" in the making!

Experience teaches you to be extra vigilant in these situations since you must be especially mindful and disciplined not to deviate from the checklist. As quickly as all the switches were flicked off, the co-pilot turned them back on from memory... I immediately knew something was amiss when I heard a thunderous noise and the loadmaster screaming over the intercom: ***"WE ARE DISPENSING FLARES"***! I quickly realized that the jettison switch was accidentally turned on, ultimately turning the starry Afghan night, into day! At the time, I was puzzled on how this could happen only to realize that I failed to follow through the actions of the co-pilot with my own checklist, complacency, fatigue and distraction got the better of me. After some deliberation we elected to continue with the mission and landed at destination without further incidents. With great embarrassment we phoned home and promptly filed a flight safety report.

This experience has taught me that checklist discipline is directly impacted by fatigue, as tired aviators may be more likely to skip important checklist steps and take shortcuts. To mitigate the risks of fatigue, aviators must always display checklist discipline and prioritize good sleep hygiene, regular exercise, and a healthy diet. It is essential to be aware of the symptoms of fatigue and take appropriate measures to mitigate them since none of us are immune to the effects.

Photo: Cpl Braden Trudeau

THE UN-INFLATABLE

by Cpl George Lavers

It was a typical day of routine maintenance at 403 SQN where we operate the CH146 Griffon. A Petty Officer Mechanic (POM) technician and I (Level A) were working normal inspections in the ALSE (aviation life support equipment) Shop. I had just completed putting our 30-day expiry warnings for aircrew ALSE on the assigned lockers, which lets them know their ALSE gear will soon expire.

A student Flight Engineer (FE) presented to the ALSE shop with a cellphone picture of his 883-inspection sticker and his warning card, adamant that his gear was good. The POM took one look at the picture and asked how a 180-day inspection was good for a year and a half as the sticker stated? The FE conceded and went back to retrieve his LP/SV (life preserver/survival vest). Upon return, I told him it may be a simple mistake when signing off the 883, but I had to verify that it was just an error. After running the paperwork I found multiple items expired during the validity of the inspection period and one expired within the month of inspection. I advised the FE that I was no longer comfortable just fixing the mistakes because of the growing errors and I would have to submit a Flight Safety (FS) Report. I gave him a loaner vest and sent him on his way.

After receiving authorization to inspect the vest from the Unit FS, we started a full 180-day inspection. What we found was troubling. Someone had modified the LP to re-route the manual inflation pull handle. Instead of being on the outside edge for easy accesss, it was routed underneath the cover between the LP and the vest and velcroed to the underside (as close to the inside corner as possible). Had the FE been in the water and needing his LP, we were uncertain he would have been able to grab the manual inflation handle, and if he did, would it have even activated? We reached out to the affected unit to make sure no other vests were modified this way. We have since instated a Unit SOP where all new students and 403 Aircrew have their ALSE gear brought to the ALSE shop for a visual/paperwork inspection.

After this incident, I had a chat with the POM, we talked about how the Flight Safety Report was not to punish or point out fault rather it was to ensure all work was done in accordance with the approved manual so it would work or when it was needed.

Everyone is susceptible to complacency, but we must remember that just because something was assembled a certain way, it doesn't mean it is correct. Trust your gut and always confirm the books before starting a job!

Photo: MCpl Robert Bottrill

Stressed by OVERSTRESS

by Cpl Karla Olivares-Meza

Technicians at 431 Sqn aren't strangers to overstress inspections, the nature of an Air Demonstration Sqn leads to a higher number of overstresses than most other units. Aviation systems technicians learn to perform several conditional inspections, and as an A level, a technician can find themselves overseeing multiple jobs in one night.

This is exactly what happened to me when I was performing an overstress inspection on a CT114 Tutor during a shift. I found a wing bolt that had loosened and multiple other bolts that had faded witness marks. My project operations manager helped me with the witness marks while I opened additional paperwork for the bolt. Throughout the shift, I was asked to inspect a speed brake job on another jet, give a second opinion on a blade dressing on a third jet, and was reminded to start the retorque of sway braces on a fourth jet.

In addition, while conducting the overstress inspection, I was periodically required by other technicians who had panels that were ready to go back on the jet. Eventually it was break time but while everyone went for chow, I stayed behind to finish the overstress inspection. I left the necessary panels to access the bolt open, and after eating, I went over to the other three jets I had been asked about. We were nearing the end of the shift and I quickly sorted through all the paperwork that needed my signatures. We had not been able to replace the loosened wing bolt, so we set up the paperwork for the next crew and added it to our handover notes.

The next day, I went into work and there was a local survey being carried out looking for cracks in the ribs under a drop-down panel in the wing, one of the panels I had left open to access the wing bolt. Two cracks were found by the technicians that had started the bolt replacement I had written up the night before. I had spread myself so thin with other jobs and focused so much on the bolt that I missed two cracks that were right in front of my face.

Since this event, I have learned to ask for help when my plate gets too full, to take my time to complete a job and to try not to multitask, no matter how many other odd jobs require attending to. Distraction, even when it's not intentional, can lead to big mistakes.

From the Investigator

TYPE: CT156 Harvard II (CT156108)
LOCATION: Moose Jaw, SK
DATE: 12 June 2024

The accident flight was part of the NATO Flying Training in Canada Program for Phase II pilot training in Moose Jaw, SK. The crew consisted of an Instructor Pilot and a Student Pilot conducting the first instrument flight in the course syllabus.

After conducting basic instrument flight manoeuvres in the practice area, the aircraft returned to the airfield to conduct practice instrument approaches. While configuring the aircraft for landing on the first approach, the crew was unable to obtain landing gear down and locked indications. The crew carried out a low approach in front of the control tower to have the tower controller confirm the status of their landing gear. It appeared that the nose landing gear was not extended. The crew actioned the Landing Gear Malfunction checklist with multiple unsuccessful attempts to cycle the landing gear. In consultation with key operations and maintenance personnel, they elected to carry out a gear up landing. To minimize damage to the aircraft the crew shutdown the engine immediately before touch-down. Once on the runway, the aircraft slid for approximately 1500 feet (457 metres) before coming to a stop. The crew carried out an Emergency Ground Egress and were recovered by first responders.

The aircraft sustained serious damage, and there were no injuries.

The investigation is focusing on technical and human factors.

Photos: Maj Hartzenberg

From the Investigator

TYPE: SZ23 Glider (C-GCSY)
LOCATION: Saint-Jean-sur-Richelieu, QC
DATE: 25 July 2024

The accident flight was part of the Air Cadet Gliding Program in Saint-Jean-sur-Richelieu, QC in support of the summer glider pilot training and involved a solo cadet student glider pilot.

The winds on the day of the accident were strong and gusty. The cadet student pilot was conducting their third glider flight of the day; their second solo flight. The flight proceeded normally until the pilot turned onto final in preparation for landing on grass Runway 3.

While on short final the left wing and fuselage struck the ground on grass Runway 2. Upon touchdown, the glider veered and came to a stop in the immediate vicinity of persons on the ground and other parked gliders.

The aircraft sustained very serious damage and the pilot received minor injuries.

The investigation did not reveal any evidence of technical issues with the aircraft and is now focusing on human, technological, and environmental factors.

Photos: Uncredited

Epilogue

TYPE: CC150 Polaris (CC150003)
LOCATION: Andersen AFB, Guam, USA
DATE: 22 July 2023

On 19 Jul 2023, a CC150 Polaris and crew were tasked to repatriate personnel and equipment from Exercise Mobility Guardian 23, a multinational Air Mobility exercise led by the United States at Anderson Air Force Base in Guam.

The aircraft, operating under callsign Can Force 3149 (CFC3149), arrived in Guam at approximately 2145 Local Time on 21 Jul 23 and was directed to parking by United States Air Force personnel. After shutting down, the crew carried out post flight checks as well as loading the aircraft with baggage and equipment for the return flight the following day. After completing their duties, the crew departed for the hotel at approximately 2300 Local Time. At approximately 1030 Local Time on 22 Jul 23, the unattended aircraft rolled backwards, followed a curved trajectory, and impacted a French Air and Space Force Airbus A400M parked on an adjacent spot.

The impact resulted in serious damage to both aircraft, but no injuries.

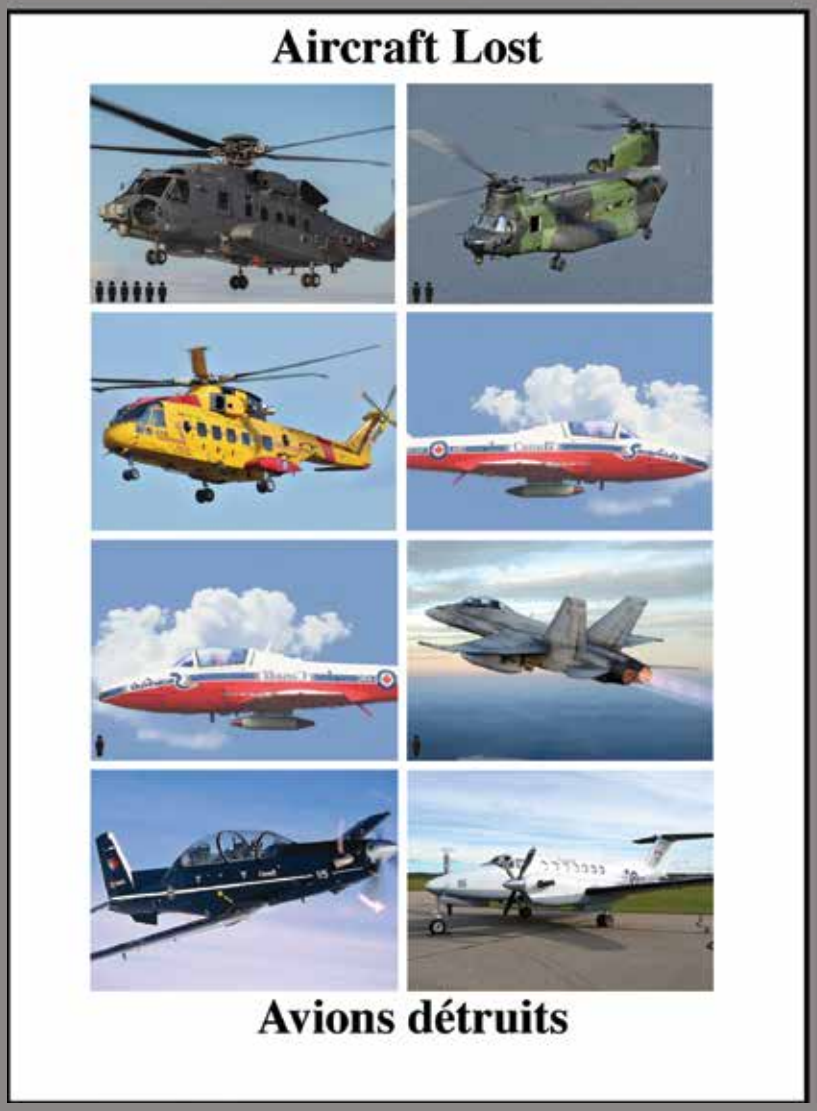
Photo: Capt Lehnart 2 Ere SV

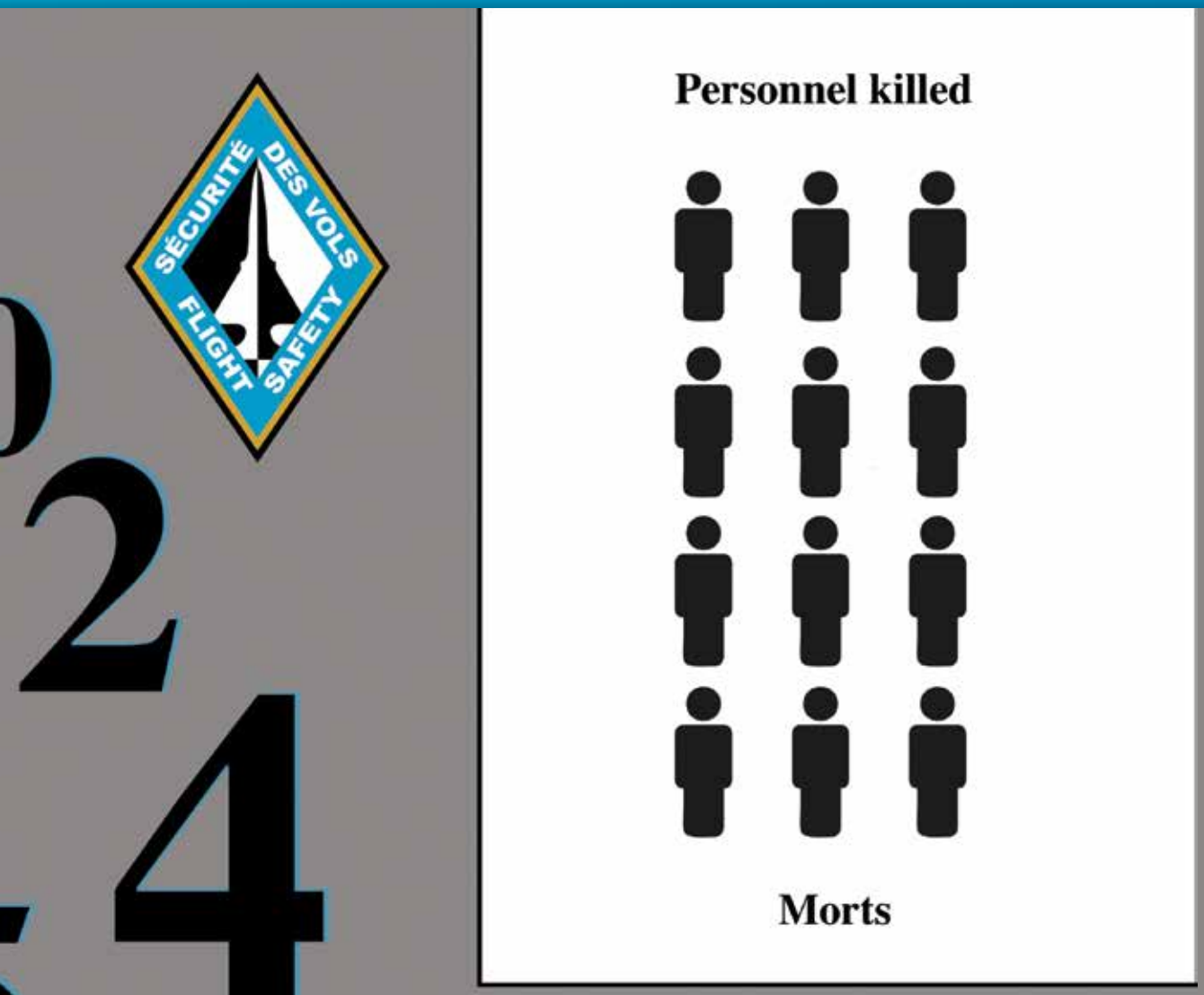
The investigation revealed the aircraft to be serviceable prior to the accident. A lack of installed chocks allowed the aircraft to roll from its position after the parking brake reached its designed holding period of 12 hours. Expectation bias, crew fatigue and checklist design contributed to chocks not being installed as well as the crew not detecting the lack of chocks prior to leaving the aircraft. The investigation recommends changes to checklists, availability of fatigue prediction software for planning, and a review of the Fatigue Assessment Report.

Photo: MSgt Haynes, 36 Wing FS, Andersen AFB, Guam

ACCIDENTAL LOSSES

2015





PERTES ACCIDENTELLES