Aviation Safety Bulletin

FIRST QUARTER 2017

A publication of the Civil Aviation Authority of Fiji

SPECIAL POINTS OF INTEREST:

- **CAAF keen for feedback**
- **Pilots are pessimists during training—and make decisions based on getting out of that trouble. In all other flying pilots tend to ignore trouble-** **page 2**

INSIDE THIS ISSUE:

Aviation safety and security starts with us

The Aviation Safety Bulletin, which is published every quarter, is designed to disseminate relevant safety information to aviation personnel and keep the reader up to date with developments in the region. It is hoped that you will consider it a consistent source of useful information, and both CAAF and the editor are keen for you to contribute with either feedback or suggestions on articles that you would like to see in this publication. CAAF may also consider running articles submitted by you in the ASB so your input is welcomed.

From time to time, this magazine will publish incident briefs and trends in safety margins, and will cover most issues that relate to the monthly operators meeting to reinforce the safety message issued by CAAF.

A milestone in Fiji aviation - an all women crew

All airspace changes are detailed in the Aeronautical Information Circular, however this magazine will cover an overview of the changes.

We need to constantly remind ourselves that in our business, there is no room for complacency. The primary goal of CAAF is to enhance and sustain the safety and security of aviation in Fiji and the region at the highest level.

Technology has improved safety and security significantly but as long as there is human involvement in aviation, human performance limitations will remain our greatest challenge. Therefore safety and security should start with us.

This magazine is published by CAAF and is edited by Molly Murphy under the authority of the regulator. CAAF also has approval to run articles from both the CAA NZ Vector and the CASA safety magazine.

All correspondence can be forwarded to CAAF addressed to the Editor, Aviation Safety Bulletin, CAAF, PMB, Nadi Airport.

Good pilots ... Bad decisions...

Why do good pilots sometimes make bad decisions.

Consider yourself in this situation: you're flying in the circuit to a short airstrip. There's a 10-metre tall line of trees on the approach end of the runway, close to the end of the prepared surface. You're very familiar with your aircraft, and very comfortable flying with the flight instructor conducting your flight review. As you make the turn onto final approach, it's very clear that you will easily clear the trees, but that you're too high to touch down on the first portion of the short airstrip. **What do you do?**

If you're like most pilots you'll apply power and begin a baulked landing (go-around) climb; return to circuit height; re-enter the circuit and try again.

Now consider this scenario: you're flying to a tower-controlled airport at the end of a long flight with your family to a holiday location. The aeroplane is heavy with baggage, with the centre of gravity well within limits but further aft than what is usual for you. The weather is fine and you're on downwind in a visual circuit to land. About the time you are abeam your touchdown spot, the tower controller asks you to

"to make good decisions, train like you fly, and fly like you train"

The author is Thomas P. Turner and the article is published with the permission of Vector Magazine, a publication of the New Zealand CAA.

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fly a tight, close-in circuit to land ahead of a regional airliner that's about 10 kilometres out. **What do you do?**

Watching many aeroplanes that are in a bad position for landing over the years, my impression is that most pilots will attempt to make the landing. They'll throw out the flaps and landing gear, as appropriate, and bank steeply to dive at the runway. Often this results in an excessive rate of descent that threatens a damaging, hard landing. Other times, excessive speed builds in the descending turn and puts the aeroplane over the threshold flying far too fast, causing it to float a long way during the flare and threatening to make the aircraft go off the far end of the runway.

Another scenario

While performing your before take-off checklist you notice that switching to the left magneto alone provides a roughly 50 rpm drop from the 'both' switch position, but selecting the right magneto alone causes the rpm to drop 225 rpm and for the engine to run roughly, the tachometer needle bouncing up and down. Thinking some of the engine's spark plugs may be fouled from combustion deposits, you select both magnetos, advance the power slightly, and lean the mixture aggressively to increase the cylinder temperature and burn off the deposits. After about a minute you re-do the magneto check. You find the left mag alone gives a 50 rpm drop, as before; the right magneto alone runs much more smoothly, but still gives about a 150 rpm drop and the tach needle still bounces a bit. **What would you do?**

My impression, based on nearly 30 years of flight instruction, attitudes and behaviours I've seen in pilots in and out of the cockpit, and my own tendencies when faced with seemingly minor issues that appear to have at least partially corrected themselves, is that on a training flight most pilots would reluctantly call off the flight and taxi the aeroplane back to the LAME's hangar. But outside of an instructional environment, I believe most pilots would mentally latch onto the minor improvement seen after aggressively ground-leaning. They'd rationalise that the problem was only a little carbon on the plugs, and that the heat and power of take-off and climb would burn the rest off. After all, it's running fine when both mags are selected, they'd think, and it got better with only a short exposure to a little extra heat during ground-leaning. **What could go wrong?**

What's the difference?

A baulked landing is a normal part of a required flight review. If you don't put yourself in a position to require a go-around while flying with an instructor, the instructor is going to have to manufacture a reason to see you practise the baulked landing manoeuvre. We expect to have to fly a baulked landing now and then during a training flight. A go-around is considered routine in a training environment. But we almost never go around outside of instructional flights.

A magneto check is a normal part of every departure, but we almost never see a bad magneto check. We know there's a 'trick' of running the engine at moderate power with the mixture significantly leaned to burn off combustion deposits, and if that trick works—even a little—it reinforces that even more heat should result in even cleaner plugs. So, in normal operations pilots are conditioned to rationalise a take-off following a bad magneto check, something they would never do with an instructor observing their actions.

In our day-to-day flying, we're far more focused on meeting the objective of making it to the planned destination. Anything less is 'failure.' Further, we want to tackle unusual situations and overcome obstacles between us and our objective. A request from a controller becomes a challenge, one that we naturally try to master.

Here's the difference: while a situation in training usually prompts a pilot to make one decision, a similar scenario in everyday flying tends to make pilots make different decisions. More succinctly, in training, pilots are pessimists—we look for problems, and make conservative decisions based on what provides the safest outcome. In non-instructional, 'normal' flying, pilots are optimists—we assume things will always turn out well, and may even get better. We make decisions that we feel will result in the most convenient result, which usually means continuing as planned to the intended destination.

I'm convinced that the difference between good decisions and bad ones is for the most part merely a matter of making decisions based on the proper objective, and the proper outlook toward the conduct of a flight.

Pilots look for trouble during instructional flights—pilots are pessimists during training—and make decisions based on getting out of that trouble. In all other flying pilots tend to ignore trouble, even when it is blatantly obvious, or they assume that things will get better whether there is evidence to support it or not—pilots are optimists in day-to-day flying. Baulked landings, getting a LAME to check out an indication before you fly, diverting because of weather, and any number of other decisions are not limitations on your day-to-day flying, they are additional options you have available to help you master your aircraft and to keep you and your passengers safe. We all just need to be a little less optimistic when we fly. You've probably heard it before, but the adage is true:

"to make good decisions, train like you fly, and fly like you train."

Lasers and what you can do to minimize the effect

What the pilot sees when a laser is directed through the cockpit

The first laser attack on an aircraft was reported in 2004 in the UK, with over 200 attacks reported by 2008 and in 2016 there are more than 4000 reports worldwide.

Fiji had its first incident in 2010, and the numbers have followed worldwide trends by increasing each year. This rapid increase has seen authorities worldwide increasing penalties for shining a laser at an aircraft, but also widening the power of police to arrest a suspect for "having a laser on their person" as in the proposed regulations in the UK. Some lawmakers in the US want to see laser pointers greater than 5mW banned outright (capable of affecting an aircraft at 12,000 feet). In Australia where pointers above 1mW have been banned since 2008, a black market has cropped up, potentially making the situation worse.

CAAF treats this matter with extreme concern and has embarked on a media campaign warning the public of the dangers of shining a bright light at an aircraft in an effort to reduce the number of incidents in Fiji.

As a pilot you may not be able to reduce the number of laser occurrences, but if an incident does occur, you can reduce the severity.

Laser events are very manageable, if you know what to do.

At a very minimum, you should read about the laser incident problem worldwide and some useful resources are available from IFALPA.

Be aware that you could be hit at any time by a laser or a bright light (searchlight), but the worst effects are at night. You may get a preliminary indication, such as seeing a beam coming towards you, or you may be illuminated by a sudden, windscreen-filling flash with no indication of direction. **Do not panic.** Understand that this is a very controllable situation, and that your eyes will almost certainly not be damaged (retinal injury) by the laser light. According to the FAA, and the CAA UK, there have been no documented cases where civil air crew have suffered **permanent** eye damage as a result of an attack.

However, pilots can expect to have their field of vision compromised, or be temporarily blinded.

The Airline Pilots Association has published guidelines for dealing with a laser event.

- **Fly the plane first.** With two pilots, the one who was not exposed should look at the instruments — not out the window. If the plane is in a critical flight phase such as landing or take-off, determine whether it can be flown without looking outside; determine whether a go-around might be prudent.
- **Do not look directly** towards the light, or the direction of the light, instead look a bit away from it. Be prepared to look completely away and warn the other pilot if the beam or light returns.
- **Block the light** if possible with a clipboard, visor or your hand. You can sometimes manoeuvre the aircraft to block the light.
- **Turn up** the cockpit lights. Light-adapted eyes are less prone to the effects of a laser.
- **Resist the urge** to rub your eyes. This can irritate the eyes and cause tearing, or a corneal abrasion.

If a laser light is aimed at you report the incident to ATC and the Fiji Police. Most Airport Police are aware of the danger of laser attacks on pilots.

A Mandatory Occurrence Report should also be filed with CAAF within 96 hours.

A laser event is a very controllable situation, given the right reactions.

HEAR TODAY GONE TOMORROW

Hearing loss: the silent pandemic

Aircraft taxiing, taking off, landing, and in flight can cause hearing damage to both aircrew and ground staff, which will not typically become apparent until 10 to 15 years after exposure. Because there are no immediate symptoms, people may not realize they are damaging their hearing. But 10 to 15 years later, it's too late.

Earplugs

Earplugs are produced to conform to the class system and range from class 1 to 5 (see sidebar). They are practical to wear with safety glasses or a hardhat on. Earplugs should be inserted with clean hands.

Earplugs will work properly, only if they are inserted correctly. Here are some brief instructions for foam earplugs.

Step 1: For roll-down type earplugs, roll the entire earplug into the narrowest possible crease-free cylinder. For all other types of earplugs start at step 2.

Step 2: Reach over your head with your opposite hand to pull your ear up and back, and insert the earplug well inside your ear canal with your other hand.

Step 3: Stop inserting the earplug when your finger touches your ear. For roll-down earplugs, hold for 30-40 seconds until the earplug fully expands.

Step 4: If properly fitted, the end of the earplugs should be just visible to someone looking at you front-on.

Step 5: Acoustic check – cup your hands over your ears and release. There should not be a significant noise difference, if there is, repeat steps 1 to 3.

Earmuffs

Earmuffs are also produced to conform to the class system and offer the same hearing protection as earplugs. Some earmuffs can be clipped onto safety helmets, or have a band which goes around the back of the neck.

For earmuffs to work correctly, they must exert a slight clamping force to the head. Never place earmuffs on anything wider than your head, as over time this can reduce the clamping force.

Hearing Protection Tips

- Always wear hearing protection when operating around aircraft.
- Provide your passengers with hearing protection.
- Use the appropriate class of hearing protection for the level of noise you are exposed to.
- Confirm that the hearing protection you intend to use meets standards. (There is joint Australian/New Zealand AS/NZS1270 standard and Fiji's regulations refer to this joint AS/NZ standard as the means of compliance).
- Earmuff cushions and foam inserts should be replaced every six months. Earmuffs should be replaced annually.
- Reusable earplugs should be replaced at least every three months and disposable earplugs should only be used once and then discarded.
- Hearing protection will be effective only if it is worn correctly.

Hearing Protection Standard

All hearing protection in Fiji should meet the joint Australian/New Zealand Standard AS/NZS1270, 2002; Acoustics – Hearing Protectors.

This standard uses a class system, which provides a simple way of selecting hearing protection appropriate for the level of noise exposure.

To see what class of hearing protection you require, match your exposure level to the appropriate class level on the graph.

For more information on hearing protection standards, see the Department of Labour web site www.dol.gov.nz, or the Fiji Labour website http://www.labour.gov.fj/laws/HASAWA_GWC_2003.pdf

Safety Trends for Fiji aviation

As a member State of ICAO, CAAF is required, as part of its State Safety Programme, to develop safety performance targets for Fiji aviation, and safety performance indicators to show that these targets are being met.

The operators are then required to provide the CAAF their performance standards based on the State targets - either recorded through the Mandatory Occurrence Reporting system, or at a mature level their own data collection systems. The collection of this data allows for the effective identification of systemic safety deficiencies within Fiji's Aviation industry but also the resolution of safety concerns.

Fiji's acceptable levels of safety (ALoS) can be found in AIC 05/13 *Fiji State Safety Programme (SSP).*

The objectives of a SSP include assurance that each ICAO State can meet the minimum required levels of safety; that the State becomes part of a harmonized global system of safety. It facilitates monitoring and measurement of safety in the region and also is an effective tool for supporting improvement within the industry here in Fiji.

CAAF has set itself seven safety indicators which reflect the safety of aviation in Fiji. As the system of collection matures and becomes more robust, this number may increase.

In the data presented below, industry can assess how we as a State of ICAO are performing.

Because this data is collected by all 192 member States of ICAO the base datum is usually 1 million flights. Movements in Fiji have been steadily increasing , but here in Fiji the average for both domestic and international flight movements is around 130,000. There was 133,704 flights for 2016.

Data is shown on pages 8 and 9 of this magazine, however performance to date is presented below.

Please discuss this with your CAAF inspector to identify how your company is performing.

The data is for the effective identification of systemic safety deficiencies

Safety Indicator	Target	Performance to date
1.8 fatal accidents for Fiji Registered aircraft per 1 million flights	40% reduction by 2018	Based on the previous one million flights since 31 December, 2016 Fiji has had 0 fatalities.
14.38 accidents for Fiji registered aircraft per 1 million flights	40% reduction by 2018 (8.62 or less accidents per 1 million flights)	Based on the previous one million flights since 31 December, 2016 Fiji has had 8 accidents.
12.19 serious incidents per 1 million flights	25% reduction by 2016 (9.14 or less serious incidents per million flights)	5 serious incidents since 2012 (about 500,000 flights).
541 bird strikes per 1 million flights in Fiji	Reduce and maintain a rate below 404 bird strikes per million flights by 2014.	Reduction achieved
8.7 classification A1 airspace incidents per 1 million flights	30% reduction by 2018 (6.1 or less incidents per 1 million flights.)	Based on the previous one million flights since 31 December, 2016 Fiji has had 6 A1 airspace incidents.
648 system component failures per 1 million flights	25% reduction by 2018 (486 failures)	Based on the previous one million flights since 31 December, 2016 Fiji has had 723 system component failures.
38% Lack of Effective Implementation (LEI) of ICAO SARPs by Fiji	Reduce the States LEI to below 20% by 2013	Fiji has 30% LEI with ICAO requirements.

It's called a 'Life' jacket for a reason

A ditching in New Zealand in 2013 illustrated how important life jacket wearing is, even if passing over water for a little while. In Fiji recently, an incident which involved the 'ditching' of the aircraft into waters off Nadi, emphasizes the need to use this safety gear. This article has been adapted from a recent Vector magazine issue.

In August 2015, when the engine of ZK-RTE broke down five nautical miles off the Canterbury coast, the pilots executed a pretty flawless return to Christchurch International Airport.

Their emergency training kicked in, and while they were fully aware of the danger they were in, the atmosphere in the Piper Arrow cockpit was calm and measured.

The only hiccup in their studied calm was having to hastily don life jackets. While stowed in the aircraft they had not been put on before the flight took off, despite the fact it was, for some time, over water.

Tension rose when the pilot-in-command Craig Vause, had trouble getting his life jacket on, because it twisted as he tried to do so. He was, however, successful on a second attempt.

Stephen Perreau, in the right seat, told *Vector* in November 2015 that not having those life jackets already on was a real mistake.

"It was a curious decision, given my practice of always doing so if I'm flying over water," Stephen told Vector. "It was definitely not the right decision to make!"

A 2003 report for Transport Canada *Survival in Cold Water (reproduced by CAAF in a previous ASB)* says that operating close to shore or in a group, or with an emergency beacon, are not reasons to go without wearing a life jacket.

Death from cold shock could occur within 3 to 5 minutes, the report said.

A quality life jacket will keep its wearer buoyant for as long as needed. American research indicates that general aviation ditching survival rates could be as high as 90 percent if the aircraft occupants are wearing life jackets.

Modern inflatable aviation life jackets are more comfortable and fit for purpose than the old, bulky ones. And the cost, relative to the cost of flying, is not high.

So there are two fewer reasons to resist wearing one.

Remember however, that the ife jacket must meet certain requirements. They can be found in Part 91, Appendix A14.

On 24 February, a Robinson R44 helicopter ditched, fortunately, in only waist deep water, about 80 metres off the shore of Lake Rotorua. The subsequent Transport Accident Investigation Commission report said "The helicopter was fitted with life jackets for everyone on board, and these were stored underneath the seats. The life jackets were not used during the emergency as there was not enough time for the occupants to locate and don them."

Rule 91.525 *Flights over water* states there should be one life jacket for each person on board a variety of aircraft in a variety of situations, and that those life jackets should be stowed in a "position that is readily accessible from the seat or berth occupied by that person." The pilot-in-command should brief passengers on the place the life jackets are stowed, as part of the standard passenger safety briefing.

But, as Vector reported, "If the ditching preparations begin at a low altitude, the chances of the aircraft's occupants being able to get into a conventional airline-style life jacket in time are almost nil."

If the intention is to fly over water during any part of the journey, the CAA (NZ) strongly recommends a pre-flight procedure should include all occupants donning a life jacket.

It could save lives. At the very least it will save unnecessary angst. Just ask Craig and Stephen.

This recommendation applies equally to Fiji aviators where much of the flying is over water.

New Search and Rescue regulations for Fiji

Every airport in Fiji has an active airport emergency plan which should be tested every two years to ensure its currency. The jurisdiction of the airport emergency response varies dependent on terrain and activity, but what happens outside of this area?

Depending on whether the emergency is on land or water, the responders ultimately responsible vary.

The following article has been provided by the CAAF Controller of Ground Safety, to highlight the recent acceptance of a SAR manual for Fiji, and the testing of the outlined responses.

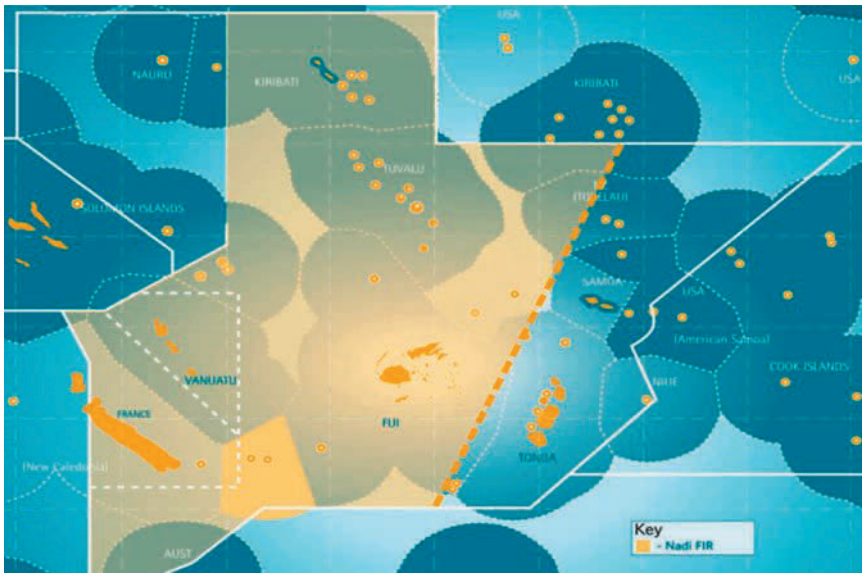
Search and Rescue (SAR) is the search for and provision of lifesaving assistance to people in distress and imminent danger of loss of life.

Fiji has obligations to establish and provide SAR services under the following international conventions to which it is a signatory:

(1) The Convention on International Civil Aviation, 1944 – Annex 12 to this Convention is applicable to the establishment, maintenance and operation of search and rescue services in the territories of Contracting States and over the high seas, and to the coordination of such services between States; (2) the International Convention on Maritime Search and Rescue 1979 – This Convention and its Annex is applicable to the development and promotion of search and rescue services by establishing an international search and rescue plan responsible to the needs of maritime traffic for the rescue of persons in distress at sea, and (3) the International Convention for Safety of Life at Sea 1974 – Regulation 15 to Chapter V of this Convention is applicable to search and rescue and requires Contracting Governments to make all necessary arrangements for coast watching and for the rescue of persons in distress at sea around its coasts.

Each State responsible for a Flight Information Region (FIR) is obligated to establish one or more Search and Rescue Regions (SRR) with an associated Rescue Coordination Centre (RCC) to receive alerts, and to coordinate and conduct search and rescue in order to assist anyone in distress within the SRR without regard to nationality or circumstances.

To fulfill this responsibility, the Fiji SRR, which is coincident with the Nadi FIR and covers an area of approximately 6.5 million square kilometers, has been established.



To ensure positive control and coordination, SAR operations are classified as follows:

✦ Class I – Land Search which is coordinated by the Police and involves SAR action for persons missing on land. It is treated as a routine police matter.

✦ Class II – Sea Search which involves extensive local search for missing persons and vessels in the Domestic SAR area. Aircraft may be chartered to assist.

✦ Class III – Air Search involves all searches other than Class I and Class II searches, being:

- all searches associated with activated emergency location transmitters (ELT);
- all searches associated with missing or distressed aircraft;
- search and rescue operations, including those for missing or distressed surface vessels or aircraft, requiring the use of national and international civil and/or military resources, or coordination with other States, controlled by the Nadi RCC;
- search and rescue operations begun as Class I or Class II when responsibility is transferred by mutual agreement to the Nadi RCC.

The Fiji SRR falls under the jurisdiction of the Nadi Rescue Coordination Centre which is maintained by Airports Fiji

Data from safety trends

Fatalities

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fatalities	1	3	0	0	0	0	0	0	0	0	0
Aircraft Movements	134,681	135,203	130,736	122,193	103,929	97,283	108,397	116,774	129,407	131,695	133, 704
Acceptable level of safety (per million movements)	0.242	0.243	0.235	0.219	0.187	0.175	0.195	0.21	0.232	0.237	0.24
Actual level of safety (1.8 fatalities per million movements)	Exceeded by 0.758	Exceeded by 2.757	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels

Accidents

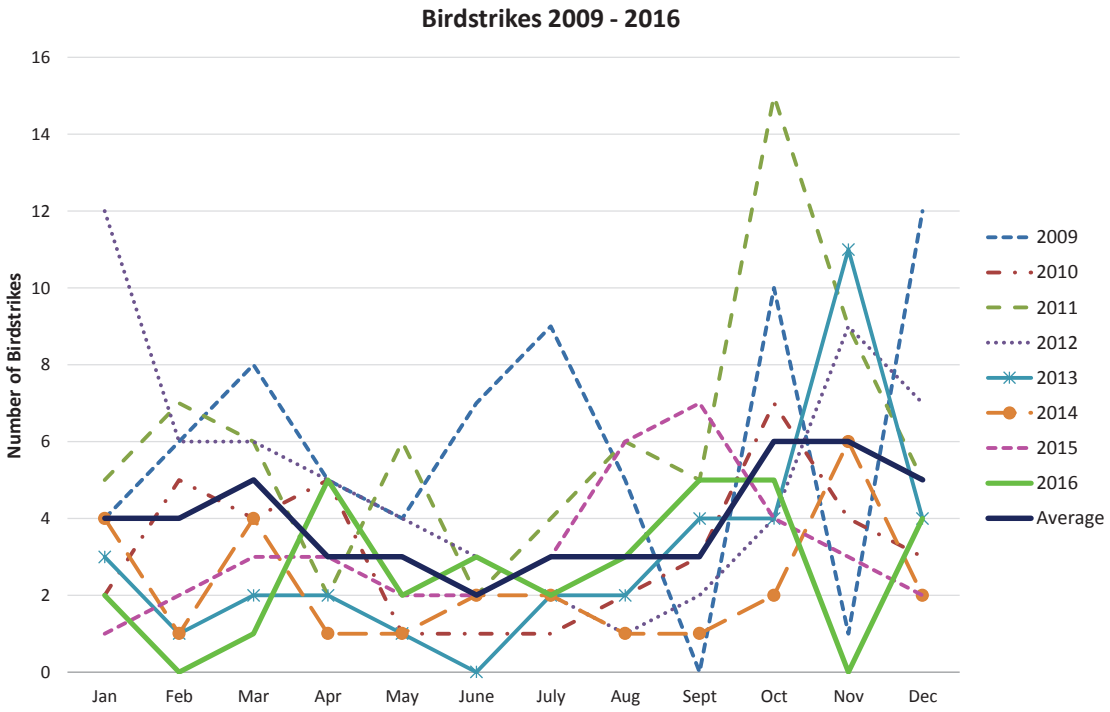
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Accidents	4	1	2	1	1	2	0	0	0	2	1
Aircraft Movements	134,681	135,203	130,736	122,193	103,929	97,283	108,397	116,774	129,407	131,695	133, 704
Acceptable level of safety (per million movements)	1.936	1.944	1.879	1.757	1.494	1.398	1.558	1.679	1.86	1.893	1.922
Actual level of safety (14.38 accidents per million movements)	Exceeded by 2.064	Within acceptable levels	Exceeded by 0.121	Within acceptable levels	Within acceptable levels	Exceeded by 0.602	Within acceptable levels	Within acceptable levels	Within acceptable levels	Exceeded by 0.107	Within acceptable levels

A1 Airspace Incidents (Incidents related to pilot error are not shown)

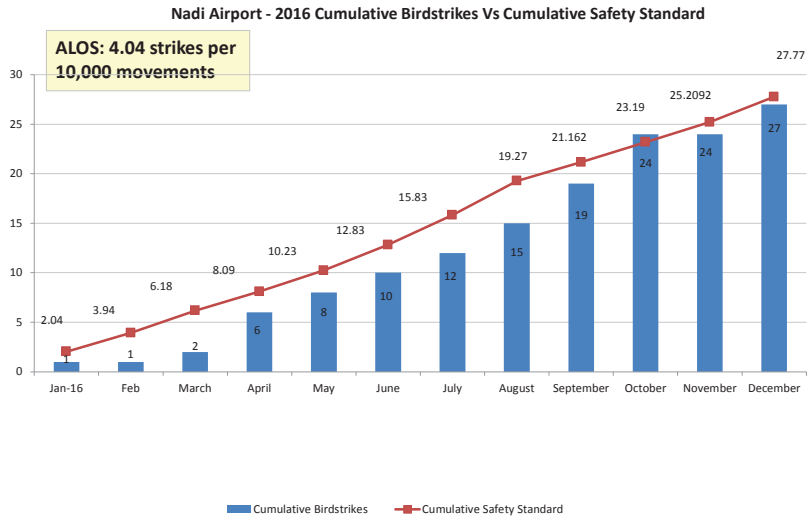
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
A1 Incidents	0	0	1	1	1	1	0	1	0	1	0
Aircraft Movements	134,681	135,203	130,736	122,193	103,929	97,283	108,397	116,774	129,407	131,695	133, 704
Acceptable level of safety (per million movements)	1.171	1.176	1.137	1.063	0.904	0.846	0.943	1.015	1.125	1.145	1.163
Actual level of safety (8.7 incidents per million movements)	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels	Exceeded by 0.096	Exceeded by 0.154	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels

Component Failures (power and non-power plant)

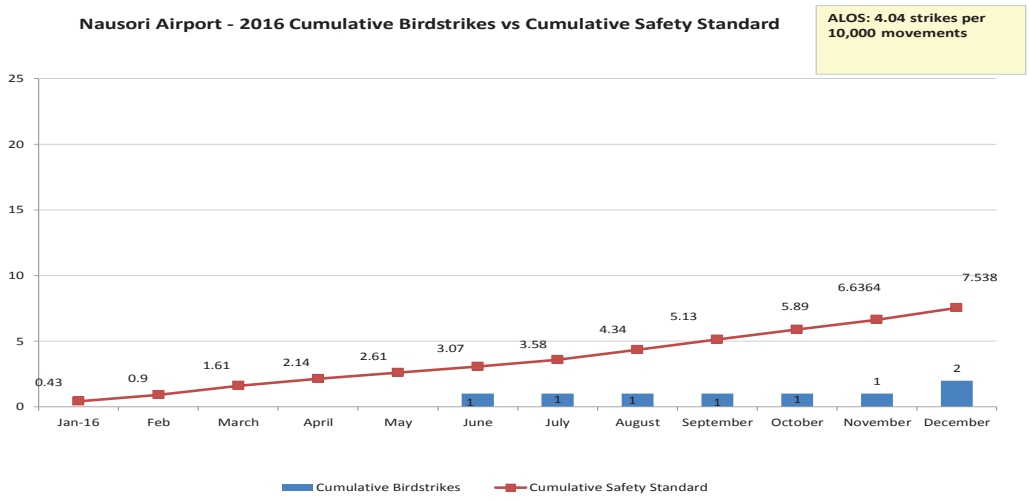
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Component failures	52	52	81	65	86	107	83	97	43	90	112
Aircraft Movements	134,681	135,203	130,736	122,193	103,929	97,283	108,397	116,774	129,407	131,695	133, 704
Acceptable level of safety (per million movements)	87.27	87.61	84.71	79.18	67.34	63.03	70.24	75.66	83.85	85.33	86.64
Actual level of safety (648 system component failures per million movements)	Within acceptable levels	Within acceptable levels	Within acceptable levels	Within acceptable levels	Exceeded by 18.66	Exceeded by 43.97	Exceeded by 12.76	Exceeded by 21.34	Within acceptable levels	Exceeded by 4.67	Exceeded by 25.36



Data courtesy of AFL Safety and Risk Management based on all AFL operated airports. There are no recorded strikes for private aero-dromes



From January to December, Nadi Airport has had a total of 27 birdstrikes; this is below the cumulative safety performance indicator of 27.77 for that period.



From January to December, Nausori Airport has had 2 birdstrike; this is below the cumulative safety performance indicator of 7.538 for that period.

Continued from page 7

Limited and is responsible for coordinating all Class III SAR activities and providing assistance during Class I and Class II searches.

In 2009 a team headed by the Ministry of Defense was established to review and amend the Fiji Search and Rescue Manual dated November 1992.

As a result of the manual review, a draft SAR Act is proposed for submission to Parliament in the first half of 2017 with the objective of:-

- implementing the State's obligations under the Conventions,
- establishing the SAR Council;
- establishment of search and rescue agencies; and
- to provide for national search and rescue services.

The revised Fiji SAR Manual which will give operational effect to the provisions of the Act was tested during a national SAR exercise in 2015 and a table top exercise in 2016.

The revised Fiji SAR Manual was later endorsed by all stakeholders during the National SAR Workshop held from the 23rd- 24th February 2017.

Should an aircraft become involved in an accident outside of the jurisdiction of the Aerodrome Emergency Plans (AEPs), the SAR machinery will be activated.

It is planned that the revised SAR Manual will be endorsed by the Minister when the SAR Act is passed by Parliament.

The revised SAR Manual will not affect an Operator's Emergency Procedures Manual.

The Ministry of Defense is responsible for the publication and coordinating the upkeep of the manual.

It is expected that the plan will be implemented by June 2017.

FATIGUE MANAGEMENT A CORNERSTONE OF SAFETY MANAGEMENT

Globally, fatigue has been blamed in numerous aviation accidents and incidents over the years. This is a trend not just found with pilots however, but occurs in air traffic control, engineering and ground handling agencies and all other aviation agencies.

Fiji is not immune to the trend and a recent CAAF audit found an aviation facility permitting 80 hour weeks.

Most operators are strict in ensuring employees remain within their duty time limitations but this is really only part of the issue. It includes how the staff are rostered, and how the employee manages his mind and body.

But how can a person recognize when he or she is too tired to do the job required of him? What roles do sleep cycles, dehydration, nutrition and illness play in identifying and responding to fatigue?

"My mind clicks on and off. I try letting one eyelid close at a time while I prop the other with my will. But the effect is too much, sleep is winning, my whole body argues dully that nothing, nothing life can attain is quite so desirable as sleep. My mind is losing resolution and control."

Charles Lindbergh about his 1927 transatlantic flight.

Causes of fatigue

- Inadequate sleep due to circadian or "biological clock" disruptions associated with rotating work and rest schedules and time zone transitions (shift lag and jet lag). For example, during a layover a pilot may attempt to sleep when his mind is telling him to be awake and active and vice versa.
- Extended duty time or long periods of wakefulness leading to increased sleep pressure.
- Night flights and early morning report times that occur during normal periods of sleep. The human brain is 'hard wired' to sleep during dark hours and be awake and active during daylight hours also known as the sleep-wake

Not Necessarily **Twice as Safe**

When one of two engines dies after takeoff, and an unseasoned pilot makes a couple of crucial errors, it takes all the experience of the training pilot to get everyone back down safely.

It was a mild morning with a 6am sign-on for a command training flight with a new line pilot in a twin engine Piper Aztec aircraft . The first sector from Gisborne to Rotorua was uneventful. The airport at Rotorua is some 950 ft amsl and surrounded by high terrain and lakes. The second sector was from Rotorua to Hamilton with the trainee pilot in the left seat, me in the right .

We lined up on runway 18 at Rotorua about 8am and began the takeoff roll. All indications during the takeoff were normal.

Once airborne the landing gear was retracted. Part way through the gear retraction at a height of approximately 150 ft agl the left engine failed.

The trainee pilot immediately identified which engine had failed, and began her initial response.

However, when she got to the pitch lever for the propeller, she did a touch check rather than actually feathering the propeller.

I saw this and immediately feathered the propeller as soon as she had removed her hand from the lever. I did a MAYDAY call to the tower advising we had suffered an engine failure.

Typically, the Aztec will fly very well on one engine, achieving around 400 ft per minute climb. However, we were still accelerating between the red line and blue line. Red line indicates Vmca, or minimum air speed that control of the aircraft can be maintained with one engine on full power and the other inoperative; blue line is best rate of climb airspeed with one engine operating.

The high angle of attack on takeoff, coupled with the initial delay in feathering the propeller, resulted in the propeller taking some time to feather as the propeller RPM was low.

There were houses and trees directly ahead of us. The trainee pilot pulled back on the controls to try to climb over them.

At that point I took control of the aircraft as our airspeed was now within 5-10 knots of Vmca and decaying. We were descending.

I lowered the nose to try to gain airspeed, and began maneuvering around the trees and houses, aiming towards Lake Rotorua.

I was convinced, however, that we were going to hit the ground before we reached the lake. In my mind I was thinking 'better to impact under control than out of control.'

It was an extremely anxious time to have maximum power on the remaining engine, correct engine-out technique applied, and yet to still be descending.

As I was maneuvering, the tops of the trees were above us, and I was thinking of what actions I would take immediately prior to impact. We were so low, the air traffic controller had lost sight of the aircraft below the tree line, and we were not showing up on the radar. He transmitted, "confirm that you can return to the airfield," to which I replied, "I don't know."

At this stage we were only about 40 feet above the ground.

Finally the aircraft stopped descending and slowly started to accelerate. Once over the lake, and now starting to slowly climb, I relaxed somewhat, believing we were going to make it.

There was a floatplane circling over the top of us in case we ditched.

I circled wide around Lake Rotorua in an attempt to gain more altitude, as there was some low terrain that we would have to pass over as we came in to land, and we donned life jackets.

The next issue was that with the left engine shut down and secured, we had no hydraulics. That meant no flaps or undercarriage. We were going to have to manually lower the landing gear. I explained to the trainee that we had only one attempt at this, and that I would select the gear down and would tell her when to start pumping the manual hydraulic pump.

We managed to attain only about 300 ft agl by the time we had lined up on final But we worked well as a team and got 3 green lights on the undercarriage before landing safely back on RWY 18.

We taxied off the runway escorted by airport fire rescue, completed our checklists, and shut down.

I checked the fuel quantity and doing a fuel drain told me that we had plenty

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of fuel and it was free of contami-nants.
The trainee and I went up to the con-trol tower. The controller said that he had completely lost sight of us for a time and had feared the worst. It is fair to say that the three of us were pretty shaken but a coffee and a good chat helped calm our rattled nerves.
Engineers traced the source of the cri-sis to the fuel control unit (FCU) which contained a fine orange sludge that had built up and corroded the inside of the unit.
The aircraft had been imported from Australia and it was thought that fine dirt had got into the fuel sys-tem from drum refueling.
The FCU on the right engine was found to be in a similar state.
During the debrief I asked the trainee why she had not feathered the propel-ler, initially doing only a touch check. She explained that she thought we were doing a simulated exercise, and therefore she did only the touch check.
I explained that we never do simulated engine failures at that height.
She also explained that she had pulled back on the control column approach-ing the houses as she didn't want to hit them or nearby trees,
I described for her the relationship be-tween airspeed, controllability and stress. The reason the aircraft was not performing was because we were still accelerating at the time of the failure, and on the back of the drag curve, whereas during simulated emergency training the aircraft is already at climb or cruise speed.
In a twin, correct speed control is eve-rything to maintain control.
On the Aztec, the left engine is the critical engine for two reasons.
Firstly due to the direction of the propellers' rotation and the off-set forces involved in that, and secondly, the engine-driven hydraulic pump is connected to the left engine.
The flaps and undercarriage on the Aztec are both hydraulic so the conse-quence of a failure of the left engine is the loss of the engine-driven hydraulic pump.
This was a particularly sobering experience. The company had come extremely close to losing an aircraft and the lives of those on board.
But I believe that my hours of multi-engine instructing and flight examining had set me up well to deal with the emergency, and that had an inexperienced pilot been involved, the outcome could well have been very different.
Twin engine aircraft are not necessarily twice as safe. In the wrong hands, they can be twice as dangerous.

This article appeared in the NZ Vector Magazine of 2016 by an uncredited author.

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- cycle. Scientific studies have shown that pilot alertness is lowest and circadian-induced fatigue is most pronounced between 0300 and 0500 hours (Caldwell & Caldwell, 2003.)

- The requirement to sleep during daylight hours. Sleep taken by night shift personnel during daylight hours is more difficult to initiate and tends to be of a shorter duration than night sleep (Caldwell & Caldwell, 2003).

- Sleep restrictions related to short layovers.
- Pathological sleepiness or sleep disorders such as sleep apnea and clinical insomnia.
- High workload or taxing mental work (especially relevant for short-haul pilots who must perform a greater number of take-offs and landings than long-haul pilots).
- Mental boredom such as boredom associated with long-haul flights when the autopilot is engaged.
- Stress, anxiety or depression.
- Mild hypoxia (oxygen deficiency).
- Poor nutrition. For example, dehydration, eating too much causing excess body weight or not eating leading to low blood sugar levels.
- Illness such as influenza (flu) and anemia (iron deficiency).
- Medication and alcohol (that reduce the quality of sleep).
- Intentional sleep restriction.
- Inadequate sleep due to uncomfortable sleeping environments.
- Poor sleeping habits such as consuming food immediately before bed and sacrificing sleep for social activities.
- Intense and prolonged physical activity.

Typical Scenarios

In a pilot, fatigue may manifest itself by:

- Inaccurate flying;
- Missed radio calls;
- Symptoms of equipment malfunctions being missed;
- Routine tasks being performed inaccurately or even forgotten; and, in extreme cases,
- Falling asleep - either a short "microsleep" or for a longer period.

In an ATCO, fatigue may result in:

- Poor decision making;
- Slow reaction to changing situation;
- Failure to notice an impending confliction;
- Loss of situational awareness;
- Forgetfulness.

Contributory Factors

- Length of previous rest period;
- Time on duty;
- Physical conditions (temperature, airlessness, noise, comfort, etc.);
- Workload (high or low);
- Emotional stress (in family life or at work);
- Lifestyle (including sleeping, eating, drinking and smoking habits) and fitness; and,
- Health

Solutions
Employers:

- Ensure that work schedules, including consecutive shift-working patterns, are constructed so as to have the least possible impact on off duty - and, if applicable, on duty rest.
- Seek to provide optimum working conditions;
- Use Crew Resource Management or Team Resource Management training to promote awareness to fatigue and sleep issues.

Pilots and ATCOs

- Adopt personal strategies which are likely to decrease the effects of fatigue such as the following:
- Planning activities, meals, rest and sleep patterns during off-duty periods;
- Making the most of permitted rest breaks, including naps;
- Advising colleagues if one detects feeling drowsy;
- Alerting colleagues if they appear to be becoming drowsy.

Regulator strategies to combat fatigue

In aviation, licensed personnel fatigue is (partially) controlled by:

1. Flight and duty time limitations imposed by regulators .
2. Companies that commit through their SMS programme to not putting pilots in the position of having to fly fatigued.
3. Training programs that educate both pilots and managers in understanding and combating fatigue.

However, in all situations if a pilot considers that he or she is too fatigued to

fly safely then he or she should act responsibly and choose not to fly. Furthermore, pilots must ensure that they take adequate rest periods and do not exceed the flight and duty time limitations imposed by the regulator.

Incidents related to Fatigue	2013	2014	2015	2016
No of incidents	6	19	40	13
Aircraft Movements	116,774	129,407	131,695	133, 704
Percentage	.005	.015	.030	.010

The ASSIST principle

Many controllers in this era of improved technology, both on the ground and in the air go through periods without ever having to handle an out of the ordinary traffic situation.

So, when an unusual or emergency situation arises during their time on watch they are pressured to remember what actions they should take.

A generic checklist for handling unusual situations, also known as "Emergency Response Procedures" is available to guide a controller's action; however, this is not exhaustive and must be used in conjunction with local ATC procedures, good judgment and expertise.

The use of abbreviations is common in the ATC world and it seems logical, therefore, that the following abbreviation be offered up to assist the controller in his/her action:-

ASSIST

A - acknowledge the call, ask for the crews' intentions when the situation permits, minimise frequency changes, and establish whether the crew is able to control the aircraft;

S - separate the aircraft from other traffic, prioritise it for landing (allow long final if requested), keep the active runway clear of departures, arrivals and vehicles;

S - silence the non-urgent calls (as required) and use separate frequency where possible;

I - inform the airport emergency services and all concerned parties according to local procedures;

S - support the flight experiencing the consequences of the emergency with any information requested and deemed necessary (e.g. type of approach, runway length and aerodrome details, etc.);

T - provide time for the crew to assess the situation, don't press with non- urgent matters.


EMERGENCY
A cknowledge
Make sure you understood the nature of emergency and acknowledge accordingly.
S eparate
Don't forget to establish/maintain separation!
S ilence
Impose silence on your control frequency if necessary.
Don't disturb urgent cockpit actions by unnecessary transmissions!
I nform
Inform your supervisor and other sectors/units concerned.
S upport
Give maximum support to pilot and crew.
T ime
Allow pilots sufficient time to work on their problem.

FEEDBACK

CAAF's quality assurance section is keen to hear from you regarding the levels of service provided. If you believe you have constructive ideas on how we can improve our service or would like to report issues of concern you may have encountered when dealing with CAAF, please send feedback to CAAF, preferably using the QA108 form that can be accessed from the CAAF website. This can be sent to CAAF by faxing it to the quality assurance officer on 6720002, dropping it in to the feedback box in the foyer of the CAAF headquarters, or emailing it to standards@caaf.org.fj.

FREE CALL

SAFETY MESSAGE LINE

PHONE YOUR SAFETY CONCERNS TO CAAF

9995201

CAAF VISION: We will be a model regulator

CAAF MISSION : We will promote effective aviation safety in Fiji and the region

AN SMS update .....

SAFETY CULTURE

An organizational culture exists in every workplace. It is manifested by "How we do business around here".

It is an enduring set of beliefs, norms, attitudes and practices within an organization concerned with minimizing exposure of the workforce and the general public to dangerous or hazardous conditions.

A positive safety culture is one which promotes concern and accountability for, and commitment to, safety.

Safety Management Systems (SMS) maintains that a fundamental requirement of a successful SMS and therefore a safety record for each organization starts with having a positive safety culture.

An organization's safety culture is crucial to its safety achievement.

The ideal safety culture supports staff and systems, recognizes that errors will be made, and believes blaming staff will not solve problems.

A positive and supportive safety culture encourages open and honest reporting, seeks to learn from its failures or mistakes, and is open and fair in dealing with those involved.

1. Trust—an atmosphere of trust exists in the organization. Staff know that if they have made an error senior management will be interested and supportive to hear how it was resolved, or assist in resolving the matter.
2. Support—senior management openly supports, promotes and encourages an open and fair reporting culture and a positive and supportive safety culture. This means it has clear guidelines on how errors and violations will be treated. These guidelines should be visibly endorsed by the Accountable Executive and made available to all staff.