AVIATION SAFETY BULLETIN

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FLIGHT & FLOW INFORMATION FOR A COLLABORATIVE ENVIRONMENT (FF-ICE)

'Promoting Effective Aviation Safety and Security in Fiji and the Region'

HIT YOUR TARGET—OR LEARN TO HANDLE REJECTION

AERODROME LIGHTING

FATIGUE MANAGEMENT

INSPIRING THE NEXT GENERATION OF AVIATORS

Cover Original Image by Shutterstock

In this issue...

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Message from the desk of
Chief Executive

Bula Vinaka Fellow Aviation Stakeholders!

I am pleased to present the second quarter edition of the Civil Aviation Authority of Fiji (CAAF) Aviation Safety Bulletin.

At the outset, I acknowledge the dedication of the CAAF inspectors and staff. CAAF has faced a lot of challenges with staffing shortages over the past few years, but I'm pleased to report that our ongoing recruitment efforts have been successful. While a few positions remain open, filling the majority will significantly ease the workload on current inspectors and pave the way for improved efficiency across CAAF.

We are also committed to continually improving our services. This quarter, we've undertaken a review of the Aircraft Maintenance Engineer (AME) syllabus to ensure it aligns with the best practices in our region. This will ensure Fiji's aviation professionals remain at the forefront of safety and technological advancements.

This edition of the bulletin explores a variety of important topics that directly impact aviation safety and security. We explore the concept of "Just Culture" and its role in fostering a reporting environment that prioritises safety over blame. We also discuss the critical skill of recognising situations that necessitate a rejected takeoff and the proper procedures for handling them.

Furthermore, we introduce the Flight and Flow Information for a Collaborative Environment (FF-ICE) concept, a potential game-changer for future air traffic management (ATM) operations. Understanding aerodrome lighting is another crucial element for pilots, and we've included a dedicated article on this topic.

Recognizing the importance of well-being for our air traffic controllers, we've included a valuable resource on fatigue management. We also take this opportunity to introduce CAAF's dedicated legal team.

On a separate note, we are proud to share that three Fijian participants successfully completed the International Civil Aviation Organization's (ICAO) Universal Safety Oversight Audit Programme (USAP) Continuing Monitoring Approach (CMA) Auditor's training course, a testament to Fiji's commitment to international aviation security.

This quarter, we were deeply saddened by the passing of Captain Sakaraia Bolanavatu, an experienced and well-respected Flight Operations Inspector. He leaves behind an enduring legacy of commitment to aviation safety and inspiring mentorship to countless individuals. We have included a tribute page in his honor.

Finally, we recognize the importance of overall health for our aviation personnel. This edition features a health article on Gluten.

I hope you enjoy the informative articles herein and utilise the valuable knowledge they offer. By working together and prioritising safety and security, we can ensure continued prosperity for Fiji's aviation industry■

Sincerely,

Ms Theresa O'Boyle-Levestam
Chief Executive

Just Culture

" ..... A machine is reliable but humans are resilient ...."

IATA Singapore.

How well is the "Just Culture" understood by you, in your company or department?

Image: sassofia

A definition of just culture states that *it is an atmosphere of trust in which people are encouraged (even rewarded) for providing essential safety-related information, but in which they are also clear about where the line must be drawn between acceptable and unacceptable behavior. (Starlite international Helicopter training Academy). However, gross negligence, willful violations, and destructive acts are not tolerated.*

The just culture in aviation stems from the assurance of safety and quality as discussed in ICAO Annex 19 Safety Management Systems. The interesting question to ask is this: " Can we be 100% safe in aircraft operations?". This is widely understood to be impossible with the presence of different array of risks to aviation operations. Most of aviation operation revolves around three important components, firstly it is the person or operator, secondly it is the machine that the person works on such as aircrafts etc. and thirdly it's the operating procedures presented to the person to operate the machine.

In order to have a safe and sound operation these three components need to complement each other; having the right competent trained personnel operate a well-designed ergonomic machine and following well defined operating procedures.

Recent studies on Human Factors reinforced the fact that we the human component are prone to error as stated by the English poet Alexander Pope in his essay on Criticism, Part 11, 1711 *stated " to err is human."* Error is normally associated with humans hence reducing our reliability in comparison to the machine and procedures prepared for us to operate under.

Given the current dynamics of the aviation we humans are prone to commit or perform many errors, unfortunately if the aviation industry wants to be the safest it could be then ironically it has to work with people who are prone to commit errors.

The JUST CULTURE provided an avenue for human error to be contained since as humans we hold the most integral part in working the aviation machines with its operating procedures as stated in the diagram above.

We humans are not reliable since we commit errors however we are resilient in the fact that we can identify our errors and adjust to minimize or correct those errors and make an attempt to remain on this correct path.

Just culture capitalizes on the fact the we humans are resilient. Just culture allows free reporting of occurrences without the fear of being punished. Just culture allows errors to be discussed in safety action groups and actioned by placing mitigation measures to control errors. Errors will have to be identified, forecasted and predicted in order for our aviation industry to be the safest it can be.

What Culture opposes the JUST CULTURE? The old culture that existed in aviation was the PUNITIVE CULTURE that seeks to punish a person or an individual once they commit an error.

In this punitive culture errors are not freely exposed due to the punitive consequences attributed to it. In a punitive culture errors are hidden within aviation systems and processes and not exposed to be dealt with, this does not foster a safety culture but works directly in opposition to it.

The important point to consider in the industry level is which culture is prevalent in your company or department? How far have you migrated from the Punitive Culture to the Just Culture? Are you receiving enough reports in your department or company to reflect the confidence of employees in freely reporting safety occurrences?

Just culture is the basis of an effective Safety Management System which reduces errors in Aviation and make our industry a safer one to operate in■

Hit your target—or Learn to Handle Rejection

Image: (modified) Adobe Stock—Maksym Dragunov

Take-off is no time for wishful thinking

Pilots tend to be optimists. Advancing the throttle(s) for take-off, expectation bias lulls us into 'seeing' all is normal and power is full, while complacency and familiarity might prevent us from crosschecking indications at all.

We might not detect a loss of performance or power, remembering that a landmark 2010 Australian Transport Safety Bureau (ATSB) study found that partial power loss occurred 3 times more frequently than total power loss, creating a hard-to-identify, demanding and time-critical threat to those aboard.

To better evaluate take-offs in real-time, it's helpful to identify 5 take-off targets and use them to continue or abort the take-off if needed. If you fail to meet these targets, you must immediately reject the take-off attempt.

Pre-take-off target

A successful take-off begins before you board the aeroplane. This is when you evaluate aircraft, pilot technique and environmental factors that affect take-off performance.

How much distance will your take-off require and how long is the available runway? Are obstacles or rising terrain on your departure path? What's the aeroplane's weight? How strong is the wind? What specific technique will you use for this particular take-off? Should you use flaps? Answering these questions and knowing and planning to achieve the goals of your take-off, needs to be done before flight, in the pre-take-off phase.

Power target

Are you getting maximum available power? You won't know for certain unless you establish some specific power targets. Flying a fixed-pitch propeller aeroplane? You should know the static rpm (tachometer reading at full throttle with no forward motion) and compare it to what you see at the beginning of your take-off roll. Same goes for the expected rpm further into the take-off when airflow often permits a fixed-pitch prop to spin faster.

In aeroplanes with controllable-pitch propellers, know the expected manifold pressure and rpm at take-off power. Most normally aspirated (non-turbocharged) engines will read about one inch below ambient pressure at full throttle. At sea level, that'll be around 29 inches of manifold pressure, with maximum manifold pressure decreasing about one inch for every 1,000 feet of field elevation above sea level. Turbocharged engines should achieve their full, rated manifold pressure regardless of airport elevation.

In all petrol aircraft engines (as opposed to diesels or turbines), mixture control is vital to achieving take-off power. Many pilots who learn to fly at near-sea-level aerodromes never learn what needs to be done with the 'red knob' before a higher altitude take-off. As pressure drops, a corresponding reduction in fuel flow is needed for maximum available power. This is exaggerated in larger, fuel-injected engines as they tend to be set excessively rich (extra fuel flow) at the full-rich position.

Check your aeroplane's pilot's operating handbook (POH) for specific guidance but, in general, fixed-pitch propeller engines need to be leaned for maximum propeller speed at full throttle. Those with controllable pitch propellers should be leaned per POH fuel-flow tables (often placarded on the fuel-flow gauge) or for a target exhaust gas temperature setting. Know what indication you're leaning for in the aeroplane you're flying and lean the mixture to achieve that target before beginning your take-off roll.

Turbine pilots may have torque or temperature limits for take-off, and often will not be able to go 'full forward' with the power levers and remain within one or the other limit.

Flying a turbine, you need to know the limiting factors for a specific take-off and ensure maximum available power within those limits.

Acceleration target

You've made your pre-take-off calculations and full power is available. But are you accelerating as quickly as expected? The measure of acceleration is usually subjective. Does it feel right?

A better measure of acceleration is to visualise the point at which you expect to reach lift-off speed. Pick a taxi turn-off, a runway distance remaining sign, a tree alongside the runway's clear area or some other feature to positively identify the spot by which you'll become airborne.

Some pilots like to use the 70/50 rule, which says you should be at 70% of your lift-off speed when you reach 50% of the calculated take-off ground roll distance (not the runway length, as is sometimes erroneously suggested). Others modify this by stating the aeroplane should attain 70% of lift-off speed within a certain number of seconds after brake release. Both work at sea level; the second will not be accurate as field elevation and density altitude increase and acceleration reduces. The 70/50 rule has its detractors, with some good arguments, but it makes calling for an abort simple if you fail to reach that speed by that point.

Lift-off target

Reaching your lift-off speed target at the predetermined distance down the runway, raise the aeroplane's nose to the necessary attitude. An aircraft has one attitude that provides optimum climb performance. Achieve that attitude and the aeroplane will climb smartly. A few degrees more 'up' and induced drag may seriously degrade climb performance; a few degrees down from optimum and climb rate may also be significantly eroded.

Note that the aeroplane's attitude is power-dependent; it will be lower at higher density altitudes when power is reduced and the consequences of improper pitch are worse. On take-off, especially when conditions require maximum performance, attitude is everything.

Source: Article by Thomas Turner; Uplifted from Flight Safety

Hit your target—or learn to handle rejection cont.....

Image: (modified) Adobe Stock—Gerrit Rautenbach

Initial climb target

For initial climb from lift-off until the transition to cruise climb (the transport-category folks call it 'first-stage' climb), you should have a pre-take-off idea of your expected climb attitude and vertical speed. Compare real indications to what you expect to decide if your take-off is going as planned, or if you need to re-check attitude, configuration (flaps and landing gear position) and power to safely climb away from the airport.

With knowledge of what you can expect in each phase of take-off, you can establish specific goals or take-off targets. Achieve a take-off target and you know it's safe to continue. Fail to meet a target and it's time to abort the take-off without hesitation.

Pilot certification standards do not require evaluating partial power loss scenarios in flight. There's nothing to require flight instructors to train pilots for anything other than total loss of thrust. Have you ever been put in a partial power loss scenario by your instructor? Is it something you should request be covered in your next flight review?

Know your take-off targets, and actively crosscheck actual indications and performance to your expectations as you charge down the runway. In most cases you'll detect an anomaly with plenty of time to abort the take-off on the remaining runway – or at least go off the departure end under control at a slow and decelerating speed.

You can't completely avoid the possibility of sudden loss of power shortly after becoming airborne; however, if the genesis of engine failure occurs before you lift off, you should never find yourself in the air struggling to find a survivable place to quickly put the aircraft down.

Handling rejection

What if you don't achieve one of your take-off targets? What if a door or window pops open, an animal appears on the runway or you're taking off into IMC and realise you left your instrument approach charts in the clubhouse? Here's what you need to do to safely reject a take-off:

- pay attention: do everything you can to avoid the need for an abort before you ever reach the runway. Don't skimp on your pre-flight inspection; don't absent-mindedly rush through the before-take-off checklist. The purpose of all this preflight work is to keep you from having to abort in the first place.

- maintain control: there's no better way to maximise your chances of survival and minimise the danger of damage than to keep the aeroplane under control. Keep its wings level and the nose pointed straight ahead. Even if you go off the runway, doing so under control maximises the chance of the aeroplane structure protecting you and your passengers. Stay positively on the controls as long as possible.
- reduce power: get the power to idle. The speed with which you need to reduce power – whether you should reduce or chop the throttle – depends on your circumstances:
    - aborting from well below lift-off speed, with lots of remaining runway? Bring the power smoothly back to idle.
    - rolling toward the last few hundred meters of the runway? Get the throttle to idle now.
    - lose an engine on take-off in a twin-engine aeroplane? Chop the throttles to remove asymmetric thrust that threatens to force you off the side of the runway.
    - going off the side of the runway? If you're pulling to the left, reducing power (in most single-engine aeroplanes) will make control easier. If drifting to the right, maintaining some power may help you keep it on the runway. But if you can't hold it on the prepared surface, bring power swiftly to idle.
- apply brakes: after reducing power, brake as needed to come to a safe stop. If you feel the wheels slipping, then 'pump' the brakes (apply and release the brakes in quick succession) until your speed is under control. Don't lock up the brakes – a skidding tyre can quickly blow, making directional control almost impossible. It may be helpful to pull all the way back on the control yoke to keep weight firmly on the main wheels to maximise brake effectiveness.

Some POHs call for retracting any take-off flaps to increase braking. If so, be very careful to select the proper handle for flap retraction. Many pilots have inadvertently pulled up retractable landing gear when they thought they were retracting flaps.

Regardless of the circumstances of your aborted take-off, the most important thing is to maintain control.

Going off the runway

Is your aborted take-off taking you off the side or the end of the runway? As time and maintaining aircraft control permit:

1. Pull the mixture control(s) or condition levers to idle cut-off. This quick action stops most fuel circulation in the engine compartment(s), important for fire prevention if your runway departure leads to a collision and engine compartment damage.
2. Turn fuel selector(s) OFF to prevent additional fuel from flowing to the engine(s) where things are hot and ready to burn.
3. Turn off the alternator or generator and battery master switches. Electricity can spark a fire if you collide with something after leaving the runway; turning off the switches shuts off this dangerous ignition source.
4. Do not pull the propeller(s) to low rpm in aeroplanes with controllable-pitch props. At the higher rpm position, propeller blades create significant drag – keeping the propeller(s) full forward will help you stop sooner.

In some multi-engine turbine aeroplanes, it may be safer to continue to climb if you lose one engine or otherwise fail to meet some take-off targets. Trust me, the 'accelerate-go' option rarely exists in multi-engine piston aeroplane operations, and often is outside the realistic realm in some turbines. If accelerate-go is available to you in the aeroplane you fly, you'll know it because you'll have practised it in a simulator that realistically mimics that aircraft type.

History shows take-offs are potentially more fatal than landings. We need a way to identify and respond to problems before they lead to accidents. By establishing take-off targets to anticipate performance, gauging actual to expected performance during take-off, and immediately executing a pre-planned take-off abort technique if you fail to achieve a target, you will be better able to handle rejection and avoid a serious take-off mishap. If you must perform a rejected take-off, swiftly follow the procedures to minimise hazards and maximise your chances of survival■

An aircraft has one attitude that provides optimum climb performance

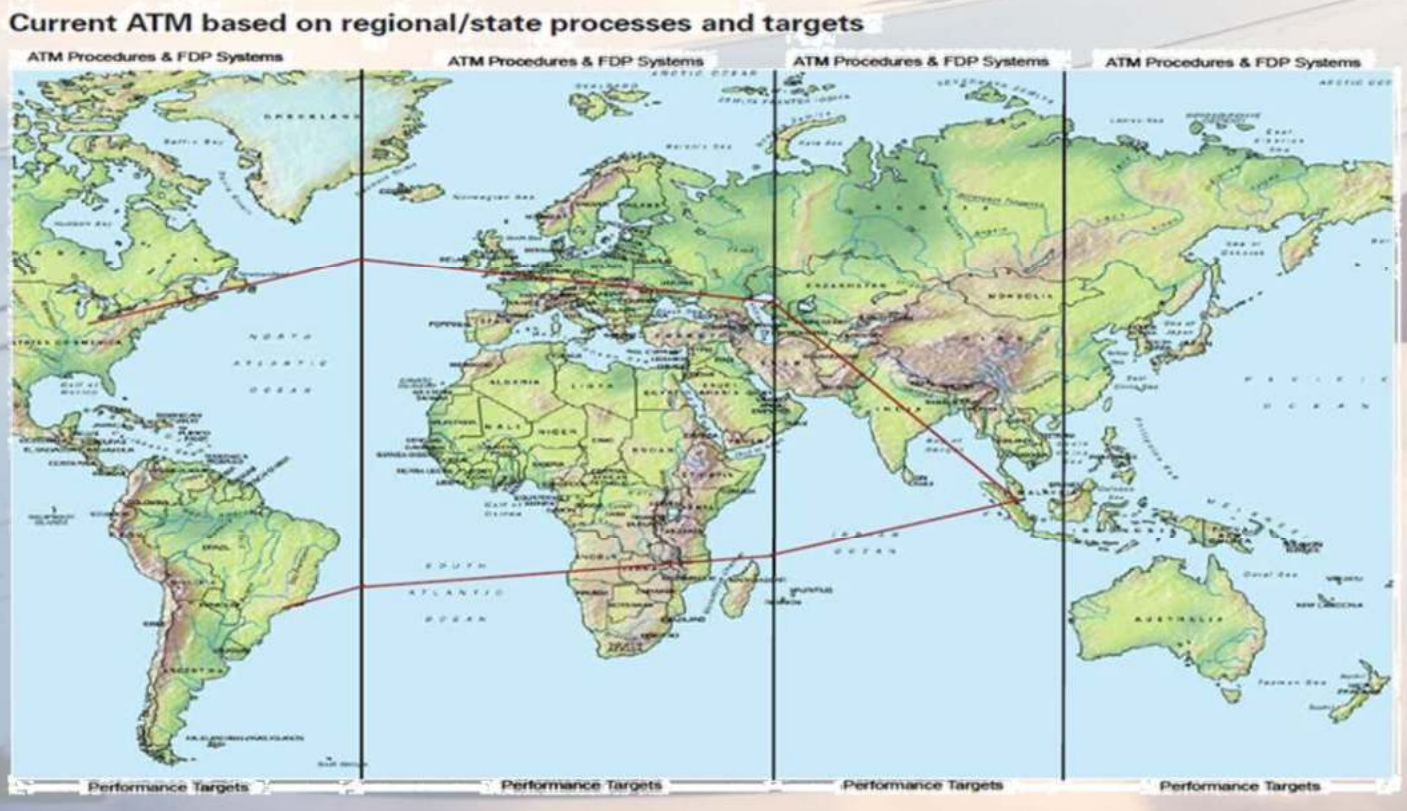
Source: Article uplifted from Flight Safety Australia (www.flightsafetyaustralia.com), May 27, 2024; Author– Thomas Turner

Flight & Flow Information for a Collaborative Environment (FF-ICE)

A Concept to Support Future ATM Operations

The Need for Change

The Global ATM Concept envisages an integrated, harmonized and globally interoperable system for all users in all phases of flight. The aim is to increase user flexibility and maximise operating efficiencies while increasing system capacity and improve safety levels in the future ATM system.



The current system, including the flight planning process, has many limitations. FF-ICE aims to establish the environment to address these limitations and to facilitate improvements such as:

- Reduced reliance on voice radio communications for air/ground links
- Increased collaborative planning amongst ATM actors
- Providing facilities for real time information exchange
- Maximising benefits of advanced equipment and encouraging deployment of improved air and/or ground systems
- Increased flexibility to permit optimum management of the ATM system through, for example, flexible use of airspace, more direct routeings, reduction in excessive system delays and aircraft operation in the most efficient performance environment
- Dynamic trajectory management

Against this background of overcoming limitations and the desire to increase operational benefits, it was necessary to significantly revise the flight planning process to support the development of a performance-based ATM system. Whilst some elements of the Global ATM Concept could be addressed within existing provisions, a much broader system of Collaborative Decision Making and exchange of information is required to facilitate gate-to-gate operations in such a performance-based environment.

PRINCIPLES

The FF-ICE is guided by the requirement to eliminate or reduce the limitations of the present Flight Plan and to accommodate the future environment detailed in the Global Air Traffic Management Operational Concept (Doc 9854).

Flight & Flow Information for a Collaborative Environment (FF-ICE) cont....

The principles of the FF-ICE can be summarized as follows:

- provide a flexible concept that allows new technologies and procedures to be incorporated as necessary in a planned manner. This flexibility should also consider the effects of evolving information and communications standards;
- allow aircraft to indicate their detailed performance capabilities, such as the required navigation performance (RNP) level;
- allow for an early indication of intent;
- incorporate information for increased and more automated CDM;
- avoid unnecessary limitations on information;
- support 4D management by trajectory;
- avoid the filing of unnecessary and ambiguous derivable information; adopt a "file-by-exception" philosophy when information cannot be standardized;
- allow for the provision of information security requirements;
- consider the cost impact on providers and consumers of flight information;
- incorporate requirements enabling a broad set of flight mission profiles;
- ensure information is machine-readable and limit the need for free-text information; and
- ensure that definitions of information elements for the FF-ICE are globally standardized.

The Role of FF-ICE

As a product of the ICAO Global ATM Concept, FF-ICE defines information requirements for flight planning, flow management and trajectory management and aims to be a cornerstone of the performance-based air navigation system. Flight information and associated trajectories are principal mechanisms by which ATM service delivery will meet operational requirements.

FF-ICE will have global applicability and will support all members of the ATM community to achieve strategic, pre-tactical and tactical performance management. FF- ICE emphasizes the need for information sharing to enable significant benefits.

The exchange of flight/flow information will assist the construction of the best possible integrated picture of the past, present and future ATM situation. This exchange of information enables improved decision making by the ATM actors involved in the entire duration of a flight, i.e. gate-to-gate, thus facilitating 4-D trajectory operations.

FF-ICE envisages that definitions of data elements are globally standardised and provides the mechanisms for their exchange. Thus, with appropriate information management, a Collaborative Decision-Making environment is facilitated enabling the sharing of appropriate data across a wider set of participants resulting in greater coordination of the ATM community, situational awareness and the achievement of global performance targets.

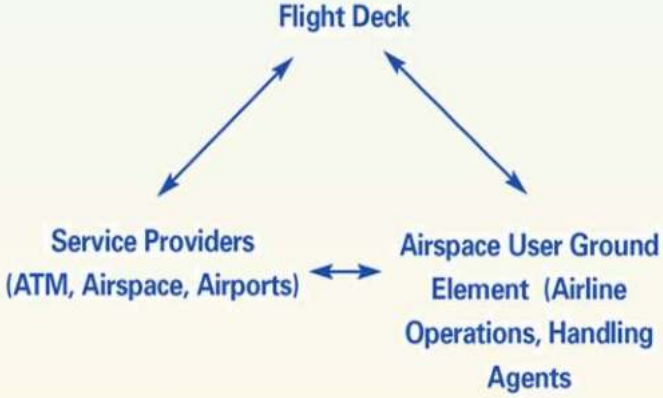



Image: FAA

The future collaborative and dynamic flight information process will involve the full spectrum of ATM Community members as envisaged in the ATM Global Operational Concept. The cornerstone of future air traffic management is the interaction between these various parties and FF-ICE allows dynamic exchange of information.

The Global ATM concept, facilitated through regional programmes such as SESAR (Single European Sky ATM Research) in Europe, NextGen (Next Generation Air Transportation System) in North America and CARATS (Collaborative Action for Renovation of Air Traffic Systems) in Japan, foresees.

Air Traffic Control becoming traffic management by trajectory. The roles of the parties illustrated above will evolve to support the requirements of this concept which will:

- Entail systematic sharing of aircraft trajectory data between actors in the ATM process;
- Ensure that all actors have a common view of a flight and have access to the most accurate data available;
- Allow operations respecting the airspace users' individual business cases.

When Will This Happen

The transition to the Collaborative Environment, of which FF-ICE is a part, is unlikely to occur on a global scale all at once but with a phased introduction up to around 2025. The timeline for the development of FF- ICE, so that flight planning provisions can meet the evolving requirements of a future automated ATM system is as follows:

- **2011 onwards** – Development of necessary standards and documentation, including implementation and transition guidance, for the full introduction of FF-ICE.
- **2012 –** FF-ICE Concept formally adopted at ICAO Air Navigation Conference. Interim amendment to ICAO guidelines for flight planning comes into effect to allow better representation of current technology, both ground and airborne, in the flight plan thus facilitating increased flexibility in ATM.
- **2014-2020** – Implementation of elements of FF-ICE to facilitate as many early benefits as possible in support of the Global ATM Concept.
- **2028 Onwards** – Full implementation of FF-ICE completed by this date at the latest.

The date for full implementation seems a long way off but participants in the ATM system are encouraged to embrace the concept now and begin evaluating the impact on systems and processes so that the transition may be as seamless as possible. The introduction of a performance-based flight and flow management system should produce significant benefits in the future.

For Fiji, aligning with ICAO's Global Air Traffic Management Operational Concept ensures that we continue to meet global performance targets and adhere to international standards. This alignment is crucial for maintaining safety and interoperability in a dynamic global aviation environment■

Source: Flight & Flow Information for a Collaborative Environment (FF-ICE); ICAO—https://www.icao.int/; IATA—https://www.iata.org.

Aerodrome Lighting

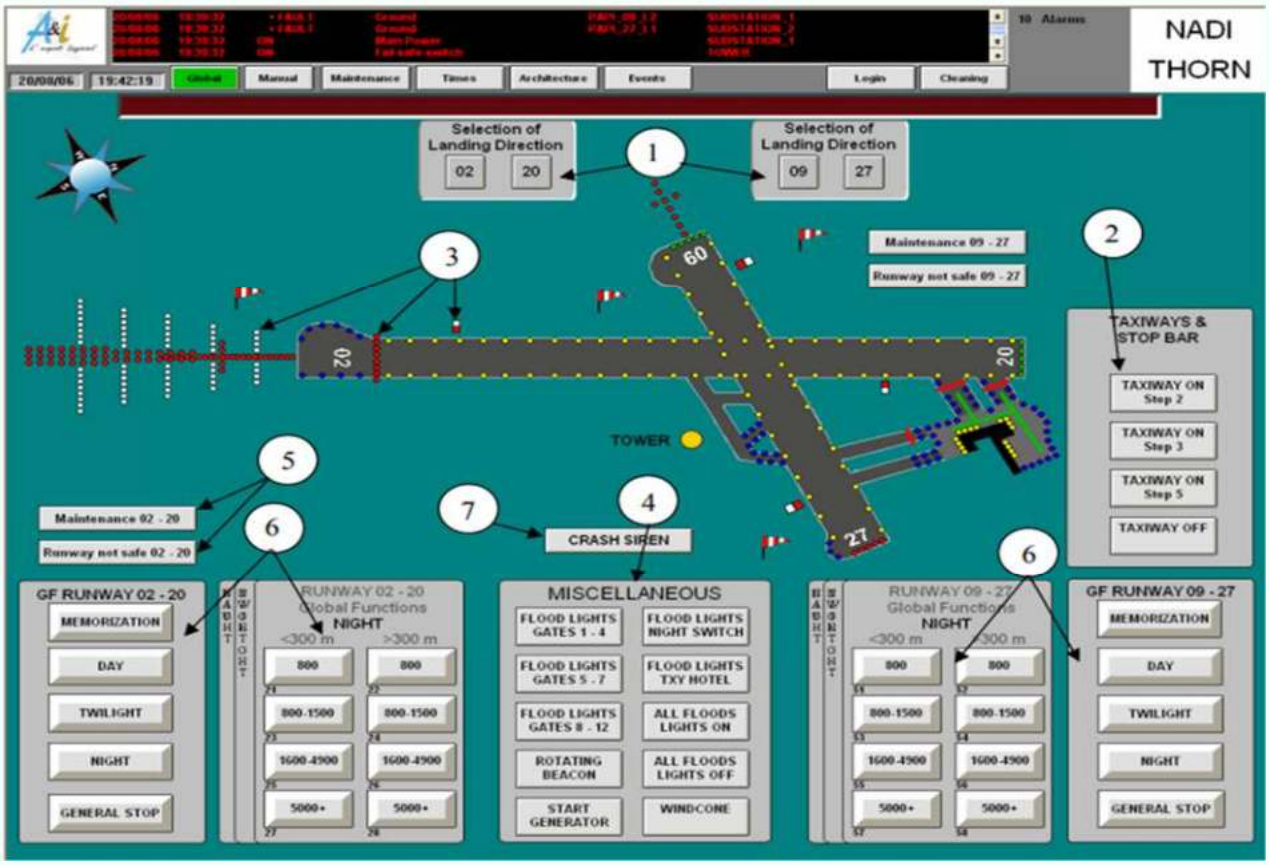
Description

Most airports have some type of lighting to identify and mark taxiways and runways and control the movements of aircraft and vehicles. The variety and type of lighting systems depend on the volume and complexity of operations at a given airport. Airport lighting is standardized so that airports use the same light colours for runways and taxiways.

The design and usage of civil airport lighting are provisions addressed by International Civil Aviation Organisation (ICAO) in ICAO Annex 14-1 Aerodromes Volume I, Aerodrome Design and Operations.

Control of Airport Lighting

Airport lighting is controlled by air traffic controllers (ATCOs) at towered airports via a touchscreen monitor. At non-towered airports, the lights may be on a timer, or where a Flight Information Service Station (FISS) is located at an airport, the FISS personnel may control the lighting. A pilot may request various light systems be turned on or off and also request a specified intensity, if available, from ATC or FISS personnel. At selected non-towered airports, a PAALC (Pilot Activated Airport Lighting Controller) system is installed. This system allows the pilot to control the lighting by using the aircraft radio. This is done by selecting a specified frequency and clicking the radio microphone a specified number of times within a specified time period (for example, 3 "clicks" within 5 seconds on frequency 130.8kHz).



NADI AIRPORT LIGHTING - CONTROL MONITORING SYSTEM

Taxiway Lights

Omnidirectional taxiway lights outline the edges of the taxiway and are blue in color. At many airports, these edge lights may have variable intensity settings that may be adjusted by an air traffic controller when deemed necessary or when requested by the pilot. Some airports also have taxiway centreline lights that are green in color.

Light Colours and Their Meanings at Runway Entrances

RED

RED lights ahead of an aircraft or vehicle mean: it is unsafe to proceed beyond the RED lights. This is the case regardless of whether the lights are fixed, alternating, or flashing and is independent of an ATC clearance. RED means stop.

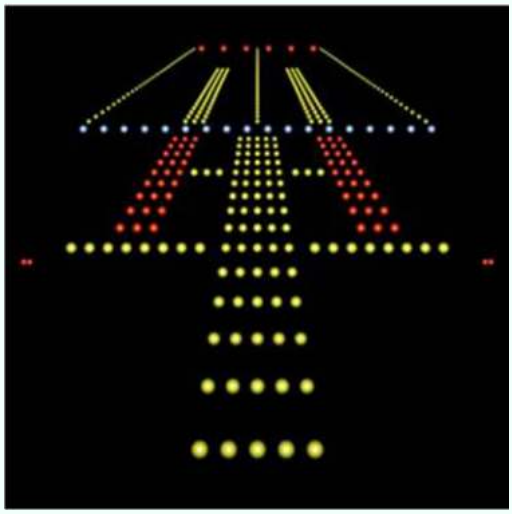
AMBER

AMBER lights are used to convey a similar but less distinct message. They indicate that a potential hazard exists beyond the lights, but that in conjunction with an appropriate ATC clearance, it will be safe to proceed.

GREEN

GREEN lights are often used to indicate the route to be followed by an aircraft or vehicle, particularly at night or in periods of reduced visibility. In all cases, green lights are a routing aid and must only be followed in conjunction with an ATC clearance.

Approach Lighting Systems



CAT II & III Approach Lighting System

CAT I Approach Lighting System (Barrett Lights)

The Approach light systems are primarily intended to provide a means to transition aircraft from instrument flight to visual flight for landing. The system configuration depends on whether the runway is a precision or non-precision instrument runway. Some systems include sequenced flashing lights, which appear to the pilot as a ball of light traveling toward the runway at high speed. Approach lights can also aid pilots operating under Visual Flight Rules (VFR) at night.

Aerodrome Lighting cont.....

Visual Glideslope Indicators

PAPI on left side of RWY

PAPI on right side of RWY

PAPI Light Unit

Visual glideslope indicators provide the pilot with glide path information that can be used for day or night approaches. By maintaining the proper glide path as indicated by the system, a pilot should have adequate obstacle clearance and should touch down within a specified portion of the runway. Two of the most common Visual Glideslope Indicators are:

- Visual Approach Slope Indicator (VASI)
- Precision Approach Path Indicator (PAPI)

Runway Lighting

There are various runway lights that identify parts of the runway complex.

All runways certified for night use must have lighting which at least defines the extent of the runway. This is referred to as Edge Lighting, Threshold Lighting, and Runway End Lighting. Other types of lighting may also be provided.

ICAO guidance requires that runway lighting shall be operated if a runway is in use for landing, take-off, or taxiing purposes at night or low visibility. Air Traffic Controllers are required to use whatever means available to them to ensure that they are aware of any lighting system unserviceability so that appropriate notification action can be taken.

Minimum Runway Lighting

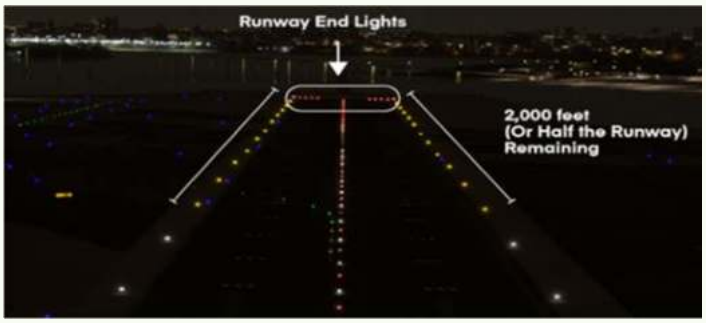
Runway Edge Lights are omnidirectional and are located along or just beyond the edges of the area declared for use as the runway is defined by edge markings and is white subject to certain specific exceptions. The area defined may not necessarily be the maximum width of the paved runway surface. The lights may be either elevated or embedded in the surface. If a landing threshold is displaced, but the pre-landing threshold area is available for take-off, then the edge lights between the beginning of the runway surface and the displaced threshold will be split so as to show red up to the landing threshold whilst still showing white after that point. If a runway 'starter extension' is provided which is narrower than its associated runway, then blue edge lighting may be used to mark its edges.

Runway Edge Lights (White)

Runway Threshold Lights are provided in a line along the landing threshold at the touchdown end of a runway and define the beginning of the declared Landing Distances. They are green and can only be seen from the approach.

Threshold Lights (green)

Runway End Lights are provided in a line along the end of the runway available for use. They are red and can only be seen in the direction of runway use.



Supplementary Runway Lighting

Various other forms of runway lighting may also be provided, especially if the runway is used for aircraft movements in less than ILS Cat 1 conditions, which require both Low Visibility Procedures (LVP) and, in most cases, specific forms of additional lighting.

- Runway Exit taxiways may be indicated by substitution of one or two of the white runway edge lights with blue ones.
- Stopway Lighting may be used to show the extent of a stop way beyond the designated end of a runway. Red unidirectional edge lights visible only in the direction of runway use are provided at intervals until a further transverse line which marks` the end of the stop way.
- Caution Zone Lighting may be provided on ILS-equipped runways which do not have centreline lighting. It is provided by replacing the usual white edge lights with yellow` ones for the lesser of the last 600 metres or last one third of the lighted runway length available to provide a visual warning the approaching runway end.

Landing Threshold Wing Bars, which are green but may take various detail forms, are sometimes provided if it is considered that the threshold needs accentuating.

Lighting Intensity

The intensity of runway lighting are adjustable so as to be suitable for the full range of horizontal visibility and ambient light in which use of the runway is intended. Flight crew can be expected to request ATC to adjust runway lighting intensity in order to ensure that, for their particular case, it is of sufficient intensity to be useful but not so bright as to hinder overall visual clarity. Whilst automatic or careful manual control of lighting intensity based upon the degree of available natural light will produce a generally acceptable lighting intensity, the intensity preferred by a particular crew may differ because of variation in pilot eye height above the runway surface (broadly proportional to aircraft size) or because of the effect of the reflective properties of moisture particles when forward visibility is restricted.

Information on Runway Lighting at an Airport

A detailed description of the runway lighting system at each certified airport must be provided in the State AIPs. It must include details, including color, intensity, and extent, of:

- the runway threshold lights and any wing bars
- the runway edge lights
- the runway end lights and any wing bars
- any runway touchdown zone lights
- any runway center line lights
- any stop way lights

Airport Beacon

Airport beacons are used to help pilots identify an airport at night. The beacons are operated from dusk till dawn. Sometimes they are turned on if the cloud base is less than 1,000 feet and/or the ground visibility is less than 3 statute miles (VFR minimums). However, there is no requirement for this, so a pilot has the responsibility of determining if the weather meets VFR requirements. The beacon has a vertical light distribution to make it most effective from 1–10° above the horizon, although it can be seen well above or below this spread. The beacon may be an omnidirectional capacitor-discharge device, or it may rotate at a constant speed, which produces the visual effect of flashes at regular intervals. The combination of light colors from an airport beacon indicates the type of airport. Some of the most common beacons are:

- Flashing white and green for civilian land airports;
- Flashing white and yellow for a water airport;
- Flashing white, yellow, and green for a heliport; and
- Two quick white flashes alternating with a green flash identifying a military airport.

Fault Reporting

Due to the critical role these lights play at airports, any fault or unserviceability to any Aerodrome lightings shall be immediately reported to ATC by the quickest means available. This will ensure that any failure is addressed quickly to avoid potential confusion or eventual runway incursions or aircraft accidents■

Source: ICAO; Skybrary .aero

Fatigue Management

Guidance for Air Traffic Controllers

Why do I need to know about fatigue?

Fatigue is something that can occur in all professions. However, in Air Traffic Control (ATC) where a 24 hour service is required and safety must be maintained at all times, it is essential that air traffic controllers understand the potential risks of fatigue and know what they can do to manage these risks. Most air traffic controllers work shifts and will already appreciate that aspects of shift-working can increase fatigue risk. ATC requires consistently good human performance – for example, strong planning, good situational awareness, sound decisions, etc. As a controller becomes more fatigued, the risk that their performance will be impaired increases and ultimately fatigue can significantly compromise their ability to carry out their tasks safely.

What is fatigue?

Rather than propose a single definition of fatigue, it is better to consider a number of key points:

- Fatigue is a normal physiological state like hunger and thirst that cannot be suppressed. It is a signal that alerts us that we need to rest.
- Fatigue typically results from prolonged mental or physical exertion. Lack of good quality sleep and illness can also cause fatigue.
- Fatigue can affect a person's performance and impair their mental alertness, which may lead to dangerous errors.
- Fatigue can be temporary (i.e. removed by rest or sleep) or chronic (i.e. building up over a long term and harder to get rid of).

There are three types of fatigue: mental, visual and physical. Operational air traffic controllers are mainly affected by mental and visual fatigue.

Recognising general signs of fatigue

Controllers may experience only some of the signs shown in the table below and may not necessarily associate them with fatigue.
There are also quite obvious outward indications such as yawning, eyes closing or changed breathing patterns.

Mental Fatigue	Visual Fatigue	Physical Tiredness
Subjective feelings of weariness, sleepiness	Heavy Eyelids	Physical symptoms such as aching muscles
Reduced ability to concentrate and pick out important information	Pain/irritation/ burning sensations in one or both eyes	Feelings of weariness need to sit down / rest
Poorer judgments / increased carelessness	Watering eyes	
Slower decision making / reaction times	Difficulty in focusing /double vision	
Less likely to detect error – both your own and other peoples'	Reddening of the eyes	
Irritability /moodiness	Headaches	

Fatigue can come on quite rapidly after a period of working, in which case the symptoms can be easier to detect. Alternatively, it can build up gradually and the air traffic controller may not necessarily recognise that they have become fatigued.

Operational staff awareness of fatigue

Quite often there may be early tell-tale signs of fatigue in air traffic controllers, for example:

- Missing pilot calls or readbacks, possibly having to ask pilots or colleagues to repeat information.
- Forgetting routine tasks (such as strip marking or transferring an aircraft to the next sector).
- Starting to fall behind in planning, maybe being caught out or surprised by something that you would normally anticipate in good time.

As fatigue becomes more obvious, the warning signs could be:

- Not seeing an aircraft when planning from the radar due to narrowed attention.
- Confusing the steps of a plan, possibly having to change a plan.
- Missing warning indications.
- Impaired team working or leadership – not communicating well with colleagues or taking longer to tell others what to do.
- Finding it harder to concentrate on the ATC situation and being more easily distracted.
- Irritability - pronounced irritability and moodiness very often triggered by routine tasks or any other trivial stimulus.

If you see these signs in yourself or colleagues, it is important to consider that fatigue may be the cause. Air traffic controllers need to recognise the signs and know how to respond in order to keep their performance acceptable and the operation safe.

Actions to minimise fatigue – being 'fit for duty'

When working as an operational air traffic controller, it is important to take responsibility for managing your fatigue (just as you would manage your personal fitness in order to pass your annual medical check). This means that each individual controller has a professional responsibility to ensure that when they arrive for work they are 'fit for duty'.

The following fatigue management aspects can be considered:

- Develop a lifestyle that takes account of working shifts.
- Get in to good habits to ensure that sufficient 'good quality' sleep (i.e. deep and uninterrupted) is obtained.
- Prepare adequately before reporting for duty.
- Prepare carefully for night shifts.
- When carrying out operational duties, use breaks to counteract fatigue.

On days off, consider the following:

- Try to stick to normal sleep patterns but if you feel particularly tired, go to bed.
- If you do something physically or mentally strenuous outside work, give yourself plenty of time to recover before starting work.
- Try to take care with the intake of caffeine, alcohol and nicotine as these can disrupt sleep.
- During extended periods away from work (e.g. annual holiday), you may get into 'bad sleep habits'. Try to get back to normal a day or two before returning to work.

Preparing for operational duties

You need to be ready to work in the ATC environment. It is vital that you plan your time to allow time for recovery from any mental and/or physical tasks you have done before starting your shift. You must also plan for an appropriate amount of time to sleep properly before returning to work. Other things to consider include:

- Be particularly careful to get enough sleep on the night before you start your first duty after being off from work.
- If you are worried that you may not wake up when you need to, use an alarm clock to take away this concern.
- Allow enough time to brief yourself with any new information when you arrive at work.

Fatigue Management

Guidance for Air Traffic Controllers cont.....

Making the most of rest breaks

It is important to try to take periodic breaks from your main task as this will help you to stay alert and manage fatigue. Air traffic controllers can use breaks to do other non-operational tasks (such as training reports, logging information) and some of these may actually add to your fatigue. Ideally breaks should give you an opportunity to recover from the mental, visual and possibly physical demands of your main air traffic control task. Ensure that the final 10-15 minutes of your break is entirely restful and relaxing, avoiding work-related or computer-based activities, e.g. internet browsing, checking emails, etc.

Individual considerations for night shifts

Night shifts challenge your normal 'body clock' (internal circadian rhythms). Naturally, you will feel most sleepy in the early hours of the morning (03.00-05.00). Individual needs for sleep and rest will differ with age and with general health. It is good to be aware of this and do certain things to make night shifts easier, such as:

- Many people prepare by sleeping or resting before a night shift.
- Eat a light meal a few hours before starting the night shift.
- Maintain alertness during a night duty by keeping up a dialogue within the team.
- If traffic and task demands are low, do not do things that are too distracting from monitoring the radar and radio. Talking and reading usually help. Interactive games and videos may be too distracting.
- If possible, move between tasks periodically during the night shift to help vary activities.
- Organise regular breaks if available and use these effectively. If you are given enough time, and your unit allows it, take a short nap (no more than 30-40 minutes) but allow 15-20 minutes to wake up properly before returning to duty. (NB Sleeping or napping should only occur if these are agreed fatigue mitigation procedures at your unit).
- If naps are not possible, try to get some fresh air and exposure to bright light during a break.

Operational staff will naturally feel tired at the end of a night shift. If you feel that this may affect your ability to drive home, you should consider sleeping before your journey home.

Managers' and Supervisors response to fatigue in operational staff

Fatigue will not just go away – it only gets worse. There are a number of steps that a manager or supervisor of operational staff can take:

- Talk to the controller and ask them if they feel fatigued.
- In a non-confrontational way, highlight any signs of fatigue that have been observed and explore the reason for these.
- Encourage the staff member to take possible fatigue seriously and refer them to the information and guidance made available to them.
- If necessary, agree a plan of action with them – possibly involving referral to a doctor or medical advisor.

Managers and supervisors should make sure that they educate themselves, in general, about fatigue. They should also realise that they too can become fatigued and this can impact their performance and ultimately the safety of the operation.

Summary

Operational air traffic controllers are susceptible to fatigue as they need to sustain accurate task performance over a shift period. As they typically work shifts, there will be times within the shift when they will need to maintain alertness when their natural circadian rhythms are making them drowsy. With careful lifestyle management outside work and fatigue management within the workplace, operational staff should be able to manage fatigue risk successfully.

Although their managers and supervisors have a role to play to support them, ultimately it is the responsibility of the controller to be aware of fatigue and to prevent fatigue from affecting their operational performance■

Source: skybrary.aero

Image: Google

Meet CAAF's Legal Team

Behind the seamless operations and regulatory oversight at CAAF is a dedicated young legal team made up of the Manager Legal & Enforcement and two Legal Officers. The legal team is dedicated in ensuring compliance with aviation standards, integrity of the aviation safety and security systems, managing enforcement matters, mitigating legal risks and providing legal advice to CAAF.

Florence Takinana - Manager Legal & Enforcement

Ms. Florence Takinana holds a Bachelors of Laws and Commerce (LLB/BCom), Professional Diploma in Legal Practice (PDLP), Professional Diploma in Legislative Drafting (PDLD) from the University of the South Pacific She worked at the Office of the Attorney General as a Senior Legal Officer prior to joining CAAF in April 2022. Ms. Florence Takinana is also the CAAF Board Secretary .

Lorina Filipe - Legal Officer

Ms. Lorina Filipe holds a Bachelor of Laws and Commerce (LLB/BCom), Professional Diploma in Legal Practice (PDLP) from the University of the South Pacific. She worked in various organisation including Fiji Public Trustees Corporation Limited, Fiji Competition and Consumer Commission and the Legal Aid Commission. She joined CAAF in January 2023.

Apisalome Kava—Legal Officer

Mr. Apisalome Kava holds a Bachelor of Laws (LLB), Graduate Diploma in Legal Practice (GDLP) and a Master of International Relations and Diplomacy (MA'INRD) from the University of Fiji. He joined CAAF as a temporary staff for legal then he moved to the Aviation Security and Facilitation Department in 2021 and he re-joined the legal section in November 2023.

Inspiring the Next Generation of Aviators

Civil Aviation Authority of Fiji (CAAF) Inspectors successfully complete Universal Security Audit Programme-continuous monitoring approach (USAP-CMA) Auditors training course, enroute to becoming International Civil Aviation Organisation (ICAO) Certified Aviation Security Auditors

Three (3) CAAF Aviation Security and Facilitation Inspectors have successfully completed the USAP-CMA Auditor Training Course conducted at CAAF by ICAO from 6th – 14th May 2024, enroute to becoming ICAO Certified Aviation Security Auditors. This is the first time ICAO has conducted the course in Fiji. The CAAF team was ably led by Senior Aviation Security and Facilitation Inspector, Mr Mosese Tuisa and included Aviation Security and Facilitation Inspectors, Ms Peniana Waqavanua and Mr Mohammed Asif Nawaz Khan. Upon successfully completing the course, the inspectors will undergo on the job training (OJT) in an ICAO mission environment within the next two (2) years. This will enable them to become fully fledged ICAO certified auditors and short-term technical experts that ICAO could call upon for future missions.

The success of the three (3) inspectors demonstrate hard work and commitment in the lead up to; and during the course, and the importance of providing training opportunities for our staff to enable them to gain the wisdom and knowledge to reach new heights and realise, their full potential. It also highlights the importance of succession planning. Knowledge is continuously changing and no one has a monopoly on knowledge. As aviation security auditors, there is a need to remain current and committed to personal development and growth. Furthermore, the three (3) inspectors have set a benchmark that will be difficult to emulate. The feat is significant in that it provides CAAF and Fiji with the capacity to further strengthen the implementation of aviation security standards. It also serves as an inspiration for other inspectors in their line of work. This achievement would not have been possible without the support of the Chief Executive, Ms Theresa Levestam and the entire CAAF team.

The primary objective of the USAP-CMA Course was to train persons in the USAP-CMA methodology to become potential ICAO certified auditors and maintain a healthy pool of aviation security auditors within the Asia Pacific Region.

The USAP-CMA Course was conducted by ICAO instructors; Messrs David Wilkinson and Mario Jenni. Both instructors have a wealth of experience in ICAO missions and USAP-CMA audits. From the outset, they reminded course participants that this was one of the most difficult ICAO courses which required hard work and commitment. Throughout the course, both instructors provided an amicable environment for meaningful learning and information sharing.

The course was a mixture of theory and practical sessions on the USAP-CMA methodology and the content included module tests, exercises, a practical 'mock' audit session at Nadi Airport, a final examination, 'mock' audit presentation and interviews.

There were sixteen (16) participants from thirteen (13) different countries that attended the course. Participants came from Fiji, Hong Kong, Kiribati, Malaysia, New Zealand, Pakistan, Philippines, Samoa, South Korea, Thailand, Tonga, United States and Vanuatu.

CAAF acknowledges with gratitude, the assistance provided by Air Terminal Service and Fiji Airports Limited in allowing the course participants to conduct a 'mock' audit at their facilities at the airport. Thank you for contributing to the success of the course.

We wish our aviation security inspectors all the best in their work and look forward to their invaluable contribution to aviation■

CAAF Inspectors Left; Mohd Asif, Ms Peniana Waqavanua, Executive Manager Aviation Security & Facilitation & Mr Mosese Tuisa

CAAF CE, with ICAO USAP-CMA Course Instructors and Participants from Fiji, Hong Kong, Kiribati, Malaysia, New Zealand, Pakistan, Philippines, Samoa, South Korea, Thailand, Tonga, United States and Vanuatu

CAA Fiji is keen to hear from you regarding our levels of service. If you believe you have constructive ideas on how we can improve our services, or would like to report instances where we have failed to meet your expectations, please send your feedback to CAAF, preferably using the QA 108 form that can be accessed from our website. This can be sent to CAAF via email or dropping it in the feedback box in the foyer of CAAF HQ, or

emailing to : *info@caaf.org.fj*

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www.caaf.org.fj

***OR* FRONT DESK, CAAF HQ.**

Is Gluten Damaging Your Health?

Introduction

This was a controversial topic in the medical profession since Gluten was discovered in 1952. It was initially labelled a fad phenomenon by many doctors. Now gluten as a source of ill-health is mainstream.

The fact is if you are suffering from any form of chronic ill -health affecting any part of your body (skin problems, hair problems, gut and digestion problems, joint problems, mental problems, low energy, brain fog etc) it is worth your while to evaluate your diet. An elimination diet by removing certain foods is not only easy to do, it also costs nothing and may also reduce your food bills.

An elimination diet for Gluten will have to take into effect these facts:

1) All Grains contain Gluten including Rice.
2) It takes about 52 hours for foods eaten to exit from the anus.
3) Anti -Gluten Antibodies formed in the blood has a half-life of 2 months ie. 50% are eliminated in 2 months. So, it could take up to a year for all the antibodies to disappear, though after 2months much improvements in health is noted.
4) Even a crumb of bread is sufficient to cause full blown Gluten Sensitivity reaction. There is no such thing as only a tiny amount won't hurt.

What Is Gluten?

Gluten is a general name for the protein found in seeds of grass, otherwise known as GRAINS. Its function for the seed is to nourish the embryo during germination and also serves a protective function, discouraging mammals from consuming the grain.

There are over a thousand forms of Gluten and many grains will contain two or more types of gluten proteins.

The **big three Grains** ie. Wheat, Barley and Rye were initially known when Celiac Disease as a disease was discovered to be caused by consumption of these three grains. The type of gluten that caused Celiac Disease is Alpha Gliadin.

However, ALL grains contain some form of gluten and there are over a thousand forms of gluten.

Thus, the common advice is to eliminate all grains from your diet. Grain is not essential to the human diet and rarely contains any nutritional benefits. Its place in world history is the fact that it is easy to grow and has fed many people out of hunger. Thus, the common advice and belief by doctors that Whole Grains are healthy is null and void.

The United States Government had mandated decades ago for all grains to be fortified with vitamins and minerals when it was found that people whose diet largely contained grains were dying of nutritional deficiencies.

Wheat Containing foods

Breads, baked goods, soups, pasta, cereals, sauces, salad dressings, roux.

Barley Containing Foods

Beer, brewer's yeast, food coloring, soups.
Malt (malted barley flour, malted milk and milkshakes, malt extract, malt syrup, malt flavoring, malt vinegar)

Rye Containing Foods

Rye bread, rye beer, cereals

GRAIN Types and Gluten Protein Content

A fully Gluten- free diet would entail the elimination of ALL GRAINS.

Grain:	Type of Gluten:	% Total Proteins
Wheat	Alpha Gliadin	69
Rye	Scalinin	30-50
Oats	Avenin	12- 16
Barley	Hordein	46-52
Millet	Panicin	40
Corn	Zein	35
Rice	Orzenin	5
Sorghum	Kafirin	52
Teff	Penniseiten	11

From the above table: Wheat contains a lot of gluten (69%) compared to Rice (5%). However, it's important to note that if your body is reacting to the protein in Rice, symptoms of disease will be similar to all other grains. Rice has been wrongly touted as Gluten Free alternative to Wheat.

It's also important to note that one grain can contain many different types of Gluten protein and all of those proteins can cause disease.

How Does Gluten Cause Disease?

Once gluten reaches the small intestine after ingestion it creates a local inflammatory response in the lining of the intestine. For an increased absorption surface area, the lumen of the intestine have villis or finger like projections. Gluten flatten and destroy these villi.

The cells lining the intestine are tightly compacted into tight junctions and restricts the absorption of certain toxins into the blood stream. When gluten has created damage, these tight junctions become leaky (Leaky Gut) and no longer serves as a barrier thus allowing many chemicals that are not supposed to be absorbed, to reach the blood stream.

Because the body sees these toxins as foreign, the Immune System is ramped up to produce antibodies against these toxins. It is these circulating antibodies that cause disease in various organs and tissues in the body making it a widespread systemic disease phenomenon.

In addition, the damaged small intestine cannot perform its absorption function of nutrients like Iron, Vit B12, Folate, Vit D which leads to Nutritional Deficiencies and Anemias.

Chronic Diarrhea also further worsens nutritional status and electrolyte dysfunction.

How Is One Predisposed to React to Gluten?

The underlying condition is called **Gluten Sensitivity**. It is a genetic trait that one is born with.

1% of people with Gluten Sensivity develop **Celiac Disease**, a disease of childhood characterized by Diarrhoea, Vomiting, Distended Abdomen and Failure to Thrive. Removing Gluten from the diet completely cures this disease in the vast majority of children.

7-15% of people, both children and adults have **Non-Celiac Gluten Sensitivity**. And these people do not have Celiac Disease but suffer a vast array of other illnesses due to Gluten Sensitivity

Is Gluten Damaging Your Health? cont....

Breast Milk

Mothers whose children are Gluten Sensitive should be aware that Gluten in the diet of the mother is secreted into the breast milk.

Other Diseases Related to Gluten Sensitivity

1) **Dermatitis Herpetiformis**

This skin rash is extremely itchy and blistering affected the legs, buttocks, elbows and scalp. In the limbs it's usually bilateral affecting both sides. It responds only to dietary gluten elimination.

Other skin disorders eg Psoriasis, Eczema, Chronic Urticaria, Hives, and Alopecia Areata are also caused by Gluten.

2) **Autoimmune Diseases**

Diseases like Hashimotos Thyroiditis, Rheumatoid Arthritis, Lupus, Dermatomyositis, Irritable Bowel Syndrome, Autoimmune Liver Disease, Fatty Liver, Type 1 Diabetes.

3) **Diarrhoea, Constipation and smelly feces**

Electrolyte imbalances, Abdominal bloating, Abdominal Pain and Nutritional Malabsorption.

4) **Fatigue**

Including chronic pain, sleep disruptions, depression and anxiety.

Contributing to fatigue and nutritional deficiencies like Iron Deficiency, Vit V12 and Folate deficiency, Magnesium, Zinc and Copper deficiencies.

Anemia is very common.

Testing for Gluten Sensitivity

The gold standard is Genetic Testing which is not offered in many Medical establishments, and certainly not in Fiji. A positive test means you carry the gene responsible for Gluten Sensitivity.

Most laboratories test for IgG and IgA antibodies in blood and saliva with a high level of false negative results.

A negative test does not mean you are free of Gluten Sensitivity. These tests can only rule-in Gluten Sensitivity if positive and not be able to rule it out when negative.

Foods That Mimic Gluten

When one is not improving on a Gluten Free Diet, consider the possibility that there are foods mimicking Gluten being consumed.

a) **Dairy**: Milk contains the protein Casein that is structurally similar to Gluten and the immune system is confused into reacting to Casein as it does to Gluten in people who are Gluten Sensitive.

Dairy products include butter, cheese and yoghurt.

The other problem with Dairy is the additive enzyme Microbial Trans Glutaminase (MTG) or often called meat glue that extends shelf life of Milk. The immune system could also be sensitized to MTG.

b) **Coffee**: The worst is instant coffee which contain wheat-based fillers in its production process

c) The Gluten Free aisle in the supermarket is fraught with foods that contain corn, oats and rice and proposed as Gluten Free. These products are also ultra-processed with its own health problems. Read the labels carefully or stick to whole foods.

d) Though not a food most Cosmetics, Skin products and medication additives contain Gluten in the form of corn products. Make sure your products and medicines are Gluten Free.

Conclusion

Gluten Sensitivity and Food Allergies are real even though majority of people are skeptical about it. Elimination Diet is free and easy to do for anyone suffering from long term ill-health and has been to all kinds of doctors without relief. Gluten Sensitivity is the most common of food allergies, so it's a logical place to start■

Author: Dr Isireli Biumaitotoya

Tribute to Late

Captain Sakaraia Bolanavatu

Late Captain Sakaraia Bolanavatu

Captain S. Bolanavatu, may he rest in peace, has left an everlasting impact on our lives, and his absence will be deeply felt. Known affectionately as Zac by his loved ones, he was born on 5th January 1969 and departed from this world on 31st May 2024, at the young age of 55.

Captain Sakaraia commenced his career as an airline pilot with Sunflower Airlines in 1993, and later joined Air Fiji from 1995 to 2001. In 2002, he became the Chief Flying Instructor at the Pacific Flying School, where he wholeheartedly engaged with trainees and supported them in pursuing their aviation aspirations.

In 2006, Zac joined Air Pacific / Fiji Airways as an airline pilot, until 2020.

In 2022, he joined the Civil Aviation Authority of Fiji as a Flight Operations Inspector, a role he held until his untimely passing.

Zac possessed an unwavering dedication to inspire, motivate, and guide others to realize their true potential. He had a remarkable ability to bring balance and accountability into people's lives, emphasizing the importance of enjoying life while nurturing a spiritual connection with God ■

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2nd Step — Formal Application

- For Recreational use, fill out OP 137
- For Commercial use, fill out OP138 & attach liability insurance, letter of intent & drone certification

3rd Step — Application Evaluation

CAAF evaluates submitted application. (5 working days)

4th Step — Formal Award of Approval

Once the evaluation process has been completed satisfactorily, CAAF issues an Authorisation to the applicant

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