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AVIATION SAFETY BULLETIN

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MESSAGE FROM CHIEF EXECUTIVE

This article will most probably reach you before the Christmas and the New year holidays and if so, may you have a joyful time with your families and friends.

On behalf of the CAAF team we wish you a successful and prosperous new year. For those of you who are working and either flying or working to support flights, we urge that you to stay safe and observe the relevant safety laws and standards. Know your limitations and remain within your own capabilities. Prepare and plan well in advance of your duty time to avoid risks and unnecessary pressures or distractions.

Our national aim is to fly without incident throughout the holiday season and achieve another accident free year.

Thank you for your support in 2013 and we look forward to our continued partnership in 2014.

Mr. Netava Waqa

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CARBON MONOXIDE POISONING

Be alert, be sensible, and don't become a victim of carbon monoxide (CO) through excess exposure and possible poisoning.

CO is a dangerous toxic gas caused by incomplete combustion, and can be introduced to aircraft cabins from leaking exhausts, inboard leaks of 'normal' exhaust gases, or from combustion heaters.

The Danger

The danger is enhanced because of CO's sinister (colourless, odourless and tasteless) properties, which make it very difficult to detect unless you have an effective detection device. These devices though are not necessarily foolproof, as illustrated by the following recent incident report submitted to the CAA.

A twin-engine aeroplane was on a routine flight when the pilot started to feel unwell. Suspecting that CO exposure might be the cause, the pilot checked the cockpit CO detector for confirmation. The detector was situated near the pilot's breathing zone and readily visible, but showed no signs of CO presence.

Consequently, the pilot naturally did not initially attribute his feeling unwell to CO exposure. Only after he was told that a combustion heater defect had been identified during the last scheduled maintenance, did he consider that CO exposure might have caused his nausea. Subsequent examination showed that cracking of the heater assembly could indeed have allowed fumes into the cockpit.

The detector was within its currency, being only six months into its 18-month life. The reason that it didn't indicate the expected presence of CO from the defective heater could not be determined. The concentration and duration of exposure to CO however, and airflows at the time around the detector, were considered to be potential factors in its failure to register the probable presence of CO.

A new CO detector of the same type was placed in the outlet flow of a car exhaust and tested, but took some time to indicate the presence of the gas.

CO Poisoning Effects

According to the Oxford Aviation Training Theoretical Knowledge manual, ***Human Performances and Limitations***, the dangers of CO cannot be overstressed. The haemoglobin in the blood has a much greater affinity for CO molecules than for oxygen (up to 250 times), and will transport them in preference to oxygen.

The manual says that the first symptoms of CO poisoning are a headache (or tightness across the forehead), nausea and dizziness. The advanced effects can include impaired vision, impaired judgement, impaired memory, flushed cheeks and cherry red lips, convulsions, and eventually death.

The manual also advises that mild hypoxia associated with flying at cabin altitudes of 8000 to 10,000 feet accentuates the effects of CO. The effects are cumulative because of the powerful binding of the CO to the haemoglobin, so a pilot who flies several times in the same day or on successive flights with exposure to CO can eventually suffer serious effects.

The recommended treatment is to isolate the source, ventilate the cabin with fresh air and take oxygen if available.

Prevention

Prevention is better than cure, so make sure that any CO-producing device is maintained properly and checked regularly.

Rule 91.509 requires a CO detector to be installed if the aircraft is fitted with an exhaust manifold cabin heater or a combustion cabin heater. If a detector is not required, give serious consideration to fitting one, depending on the aircraft and its risk of exposure. A good quality CO detector should be installed and regularly checked.

Remember though, from the example, that these devices may not necessarily be foolproof, so be alert to any personal signs of exposure and err on the side of caution if in doubt. ■

(Source: Vector March/April 2012)

OBSTRUCTIVE SLEEP APNOEA

You may not think that snoring is something you should be overly concerned about, but if you are a frequent loud snorer, you could be suffering from a potentially serious sleep disorder, Obstructive Sleep Apnoea (OSA).

Asleep at the Yoke

In 1994, the lone pilot of a Piper Seneca fell asleep while enroute from Springfield, Kentucky, to Crossville, Tennessee, in the United States. When he awoke five hours later, he was over the Gulf of Mexico, 210 miles south of Panama City. Only 20 minutes of fuel remained.

While enroute to the nearest airport, the engines quit due to fuel exhaustion and the aircraft was ditched. The pilot was rescued by a Coast Guard helicopter.

The pilot of the Piper Seneca didn't understand the risks associated with sleep deprivation, and failed to recognise the warning signs prior to the flight.

Sleep deprivation is usually thought about in terms of quantity of sleep. This can be managed through a comprehensive Fatigue Risk Management System. But OSA affects sleep quality rather than sleep quantity.

What is OSA?

When you sleep, all your muscles relax, including the muscles that hold the respiratory passages open. In some people, the airway becomes narrow enough that breathing causes the respiratory passage to vibrate and make noise – also known as snoring.

Apnoea is a medical term that means 'being without respiration'. An apnoea occurs when the airway becomes partially or completely shut while asleep. During an apnoea, breathing briefly pauses or becomes very shallow. The person will continue to sleep even though they are struggling to breathe.

Eventually, the need to breathe will overcome the ability to stay asleep. In most cases the person won't fully wake up, but they will leave a state of deep sleep and enter a state of lighter sleep. This allows the muscle tone in the throat to return, unblocking the airway.

These pauses can occur hundreds of times a night, and when they do, the medical condition is termed OSA. This is one of the most commonly diagnosed sleep disorders internationally and is estimated to affect two per cent of women and four per cent of men.

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OBSTRUCTIVE SLEEP APNOEA CONT...

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The repetitive brief arousals caused by OSA lead to the same effects caused by sleep deprivation.

Those suffering from OSA will experience daytime sleepiness, along with impaired reflexes and concentration. Most people with OSA are overweight, and have higher deposits of fatty tissue in their respiratory passages.

Self-diagnosing

Dougal Watson, CAA Principal Medical Officer, comments that it's difficult to determine whether you have a run-of the-mill snoring issue, or are suffering from OSA.

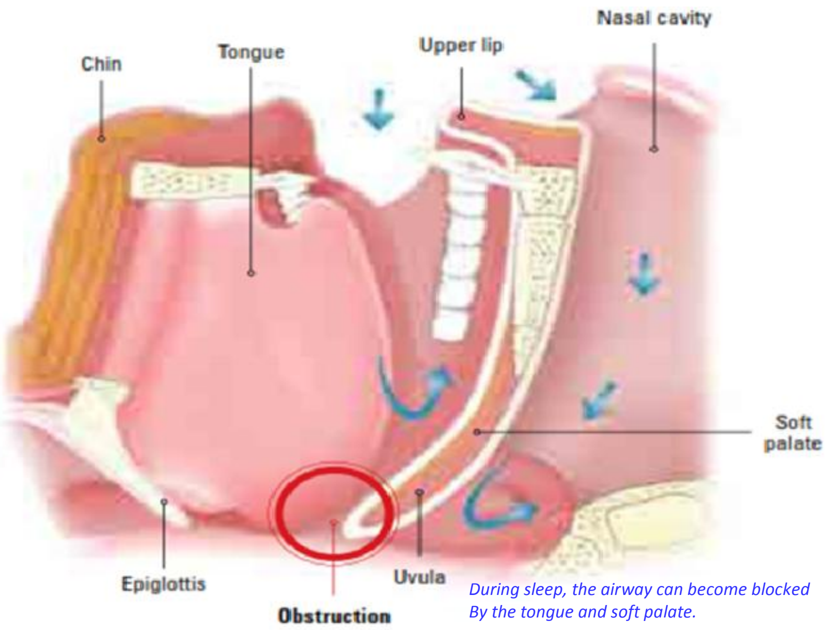
"Not only is it difficult to tell if you have OSA, but people often underestimate the degree of their fatigue," says Dougal.

Your answers to the quiz below will help you determine if you are an OSA sufferer:

What's Your Snore Score?*

- Are you a loud and/or regular snorer?
- Have you been observed to gasp or stop breathing during sleep?
- Do you feel tired or groggy on awakening, or do you awaken with a headache?
- Are you often tired or fatigued during wake-time hours?
- Do you fall asleep sitting, reading, watching TV, or driving?
- Do you often have problems with memory or concentration?

If you answered "yes" to one or more of these questions, you are at a higher risk of having OSA and should consult



During sleep, the airway can become blocked By the tongue and soft palate.

a doctor.

Other symptoms include:

- Waking up with a dry mouth or sore throat
- Insomnia or night-time awakenings
- Mood changes and irritability
- Anxiety and depression
- Forgetfulness
- Decreased sex drive
- Unexplained weight gain
- Heartburn
- Night sweats.

Although chronic snoring is the most common symptom of OSA, not everyone who has OSA is a chronic snorer, and not all chronic snorers have OSA. Generally, how you feel during the day should be a good indication of the quality of sleep you are getting. If you constantly feel washed-out and fatigued, it's best to get a professional assessment done.

What's the Risk?

Sleep researchers have found that the effects caused by sleep deprivation closely resemble those associated with alcohol intoxication. One study showed that after being awake for 24 hours, the test subject's impairment level closely resembled a blood alcohol content of 0.10 per cent – too drunk to drive (New Zealand's limit is 0.08 per cent) and unfit to fly.

There are also serious health implications. If left untreated, OSA can lead to health problems, including:

- High blood pressure
- Stroke
- Heart disease
- (30 per cent increased risk)
- Weight gain and obesity
- Diabetes
- Clinical depression.

Seeking early medical assistance can provide long term benefits, such as improved health, and a prolonged flying career.

It's Easily Treatable

If you are diagnosed with OSA, you need to notify the CAA about your change in medical condition. Don't stress – OSA can be very successfully treated. After recovery, licence holders can generally return to active duty within a few weeks.

Remember to attach any supporting reports or information that will assist the CAA doctors when they assess your condition. ■

(Source: Vector Sept/Oct 2013)

ILLEGITIMATE USE OF LASER LIGHTS IN VICINITY OF AERODROMES

In recent years there has been a proliferation in the use of lasers outdoors for legitimate purposes such as laser shows and tests. However, more worryingly, is the increase in the deliberate and illegitimate use of laser pointers towards aircraft on critical phases of flight such as take-off, approach and landing. This misuse of hand-held laser devices which are being used to target aircraft and sometimes ATC facilities is a growing menace to aviation.

Directing a laser light towards an aircraft on approach to land or departing from an airport has severe safety implications by causing temporary blindness to pilots which in turn endangers the aircraft and passengers on board. This illegal act is a serious breach if Fiji's Air Navigation Regulations and as such is also a criminal offense

Any person who is caught pointing laser lights to any aircraft could be charged under the criminal law and be liable for prosecution.

We are all in some way or another affected by our Aviation industry and thus it is vital that all in the community be vigilant and work together to minimize this threat. All are requested to:

- Refrain from pointing laser lights towards aircrafts;
- Report any sightings of any laser lights being directed at aircraft on approach to land or during take-off to the nearest Air Traffic Service unit or a Police station nearest you ∎

(Article by: Ground Safety Department)

CYBER SECURITY THREAT

Website of Seletar Airport has become the latest to be hit by hackers - the second in three days.

Photo illustration of a hacked website. (AFP/ Illustration - Joel Saget)

SINGAPORE: The website of Seletar Airport has become the latest to be hit by hackers - the second in three days.

At around 12.30pm on Sunday, the site showed a black and green background with an image in the middle resembling a skull wearing a hood.

It was back running less than 30 minutes later.

The Infocomm Development Authority (IDA) and Changi Airport Group, which manages Seletar Airport, could not respond to queries at press time.

On Friday, The Straits Times' website was hacked by someone claiming to be from the hacking collective, Anonymous.

The hacker, who went by the moniker "The Messiah", said the attack was prompted by a "misleading" report published on the paper's website about a YouTube video posted on Thursday, in which he threatened to attack the Singapore Government.

It is unknown who is behind the attack on Seletar Airport's website. "The Messiah" had previously claimed responsibility for the hacking of a few local sites this year, including those of the PAP Community Foundation, Ang Mo Kio Town Council and City Harvest Church co-founder Sun Ho.

Meanwhile, the police also said on Sunday that there were no investigations into the government sites that were down for "planned maintenance" the day after the attack on The Straits Times.

The IDA said on its Facebook page that maintenance on the 19 government sites - including those of the Social and Family Development and Transport ministries, the Singapore Police Force and PUB - took longer than expected because of technical difficulties.

The police said that "misreporting" in an earlier news article had led to the spread of the "inaccurate information" about investigations into the government sites' downtime ∎

(Article by: Aviation Safety & Facilitation Department)

MICROBURST

A **microburst** is a very localized column of sinking air, producing damaging divergent and straight-line winds at the surface that are similar to, but distinguishable from, tornadoes, which generally have convergent damage. There are two types of microbursts: wet microbursts and dry microbursts. They go through three stages in their life cycle: the downburst, outburst, and cushion stages. The scale and suddenness of a microburst makes it a great danger to aircraft due to the low-level wind shear caused by its gust front, with several fatal crashes having been attributed to the phenomenon over the past several decades.

A microburst often has high winds that can knock over fully grown trees. They usually last for a duration of a couple of seconds to several minutes.

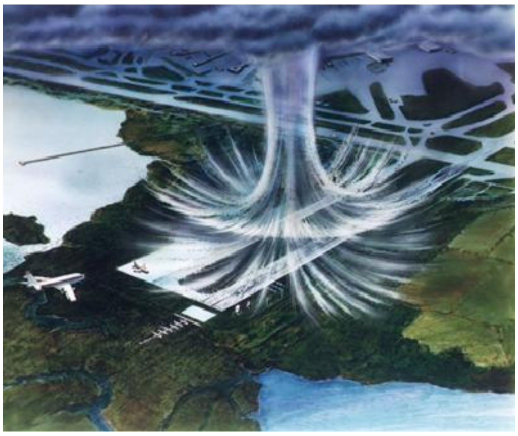


Illustration of a microburst. The air moves in a downward motion until it hits ground level. It then spreads outward in all directions. The wind regime in a microburst is opposite to that of a tornado.

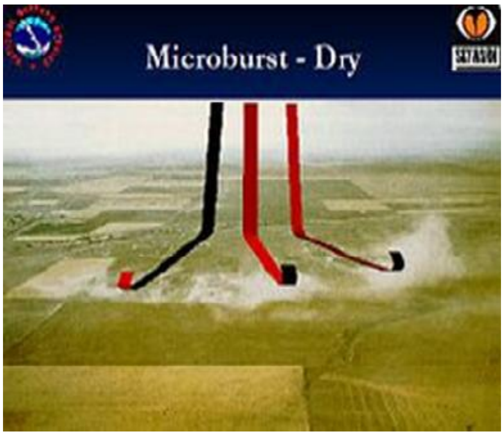
Tree damage from a downburst

History of term

The term was defined by senior weather expert Tetsuva Theodore Fujita as affecting an area 4 km (2.5 mi) in diameter or less, distinguishing them as a type of downburst and apart from common wind shear which can encompass greater areas. Fujita also coined the term **macroburst** for downbursts larger than 4 km (2.5 mi), a scale of size known as the mesoscale.

A distinction can be made between a **wet microburst** which consists of precipitation and a **dry microburst** which consists of virga. They generally are formed by precipitation-cooled air rushing to the surface, but they perhaps also could be powered from the high speed winds of the jet stream deflected to the surface in a thumberstorm (see downburst).

Microbursts are recognized as capable of generating wind speeds higher than 75 m/s (168 mph; 270 km/h).

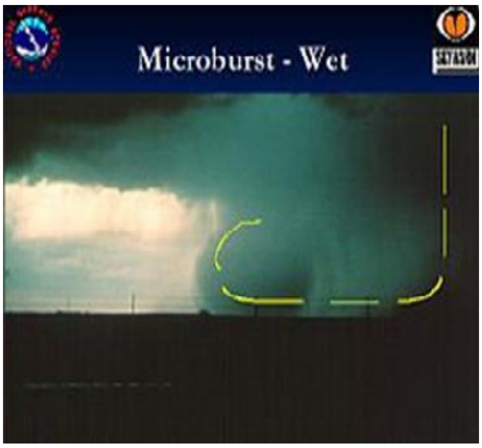


Dry microburst schematic

Dry microbursts

When rain falls below cloud base or is mixed with dry air, it begins to evaporate and this evaporation process cools the air. The cool air descends and accelerates as it approaches the ground. When the cool air approaches the ground, it spreads out in all directions and this divergence of the wind is the signature of the microburst. High winds spread out in this type of pattern showing little or no curvature are known as straight-line winds.

Dry **microbursts**, produced by high based thunderstorms that generate little surface rainfall, occur in environments characterized by a thermodynamic profile exhibiting an inverted-V at thermal and moisture profile, as viewed on a Skew –T log-P thermodynamic diagram. Wakimoto (1985) developed a conceptual model (over the High Plains of the United States) of a dry microburst environment that comprised three important variables: mid-level moisture, a deep and dry adiabatic lapse rate in the sub-cloud layer, and low surface relative humidity.



Wet microburst schematic

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MICROBURST CONT….

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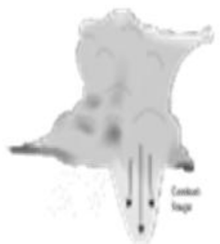
Wet microbursts

Wet microbursts are downbursts accompanied by significant precipitation at the surface which are warmer than their environment (Wakimoto, 1998). These downbursts rely more on the drag of precipitation for downward acceleration of parcels than negative buoyancy which tend to drive "dry" microbursts. As a result, higher mixing ratios are necessary for these downbursts to form (hence the name "wet" microbursts). Melting of ice, particularly hail, appears to play an important role in downburst formation (Wakimoto and Bringi, 1988), especially in the lowest one kilometer above ground level (Proctor, 1989). These factors, among others, make forecasting wet microbursts a difficult task.

Characteristic	Dry Microburst	Wet Microburst
Location of Highest Probability within the United States	Midwest/West	Southeast
Precipitation	Little or none	Moderate or heavy
Cloud Bases	As high as 500 mb	As high as 850 mb
Features below Cloud Base	Virga	Shafts of strong precipitation reaching the ground
Primary Catalyst	Evaporative cooling	Downward transport of higher momentum
Environment below Cloud Base	Deep dry layer/low relative humidity/dry adiabatic lapse rate	Shallow dry layer/high relative humidity/moist adiabatic lapse rate
Surface Outflow Pattern	Omni-directional	Gusts of the direction of the mid-level wind

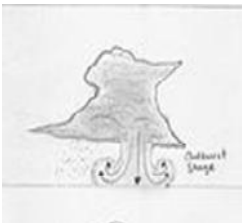
Development stages of microbursts

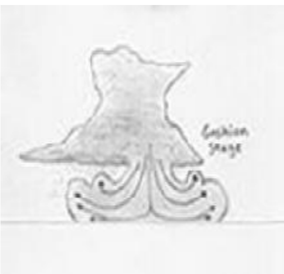
The evolution of downbursts is broken down into three stages: the contact stage, the outburst stage and the cushion stage.



A downburst initially develops as the downdraft begins its descent from cloud base. The downdraft accelerates and within minutes, reaches the ground (contact stage). It is during the contact stage that the highest winds are observed.

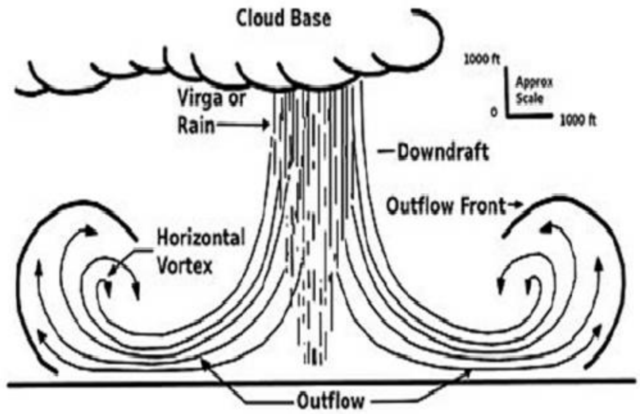
During the outburst stage, the wind "curls" as the cold air of the downburst moves away from the point of impact with the ground.





During the cushion stage, winds about the curl continue to accelerate, while the winds at the surface slow due to friction.

Physical processes of dry and wet microbursts



Simple explanation

During a wet microburst, the atmosphere is warm and humid in the lower levels and dry aloft. As a result, thunderstorms there produce much rain, some of which evaporates in and cools the drier air aloft, which therefore falls and spreads, potentially causing strong winds and heavy rain. Wet downbursts can be visually identified by such features as a shelf cloud; on radar they sometimes produce bow echoes.

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MICROBURST CONT….

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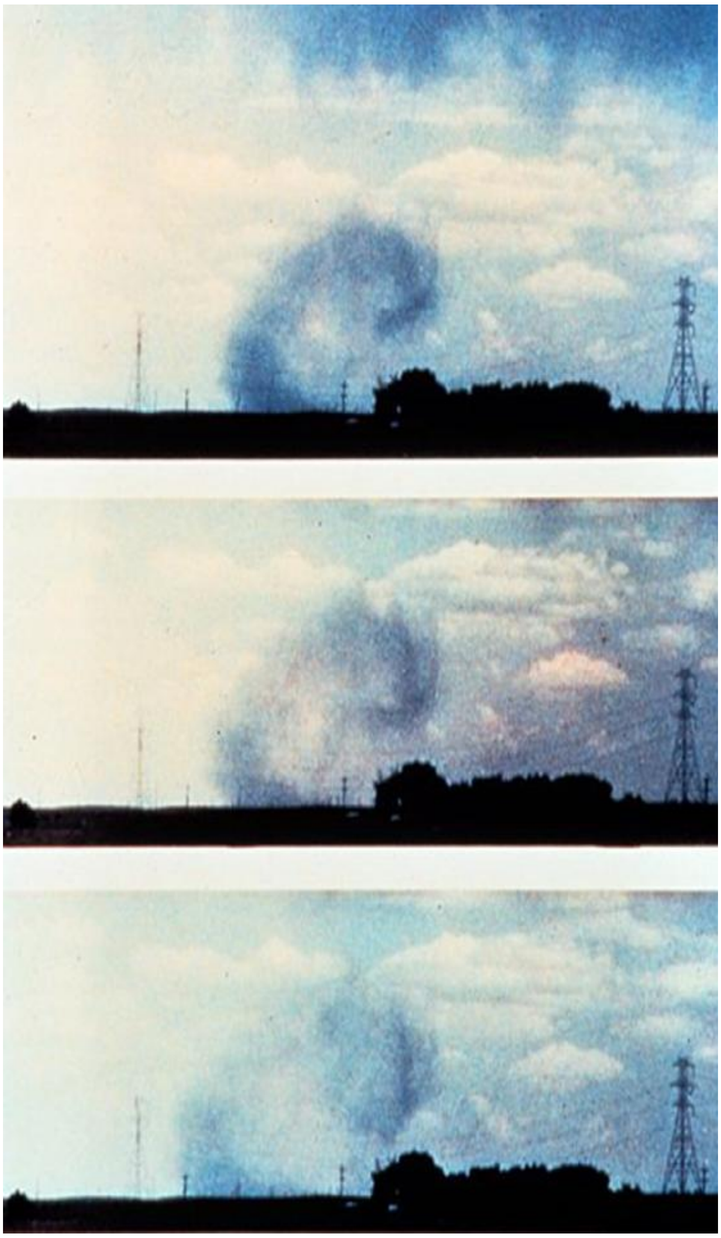
During a dry microburst, the atmosphere is warm and dry in the lower levels and moist aloft. When showers and thunderstorms develop, most of the rain evaporates before reaching the ground.

Danger to aircraft

Further information: Downburst and Wind shear

The scale and suddenness of a microburst makes it a notorious danger to aircraft, particularly those at low altitude which are taking off or landing. The following are some fatal crashes and/or aircraft incidents that have been attributed to microbursts in the vicinity of airports:



A photograph of the surface curl soon after a microburst impacted the surface.

- A BOAC Canadair C-4 (G-ALHE), Kano Airport - 24 June 1956;
- A Malév Ilyushin Il-18 (HA-MOC), Copenhagen Airport – 28 August 1971;
- Eastern Air Lines Flight 66 Boeing 727-225(N8845E), John F. Kennedy International Airport – 24 June 1975;
- Pan Am Flight 759 Boeing 727-235 (N4737), New Orleans International Airport – 9 July 1982;
- Delta Air Lines Flight 191 Lockheed L-1011 TriStar (N726DA), Dallas/Fort Worth International Airport – 2 August 1985;
- Martinair Flight 495 McDonnell Douglas DC-10 (PH-MBN), Faro Airport – 21 December 1992;
- USAir Flight 1016 Douglas DC-9 (N954VJ), Charlotte/Douglas International Airport – 2 July 1994;
- Goodyear Blimp GZ-20A (N1A, "Stars and Stripes"), Coral Springs, Florida – 16 June 2005;
- Bhoja Air Flight 213 Boeing 737-200 (AP-BKC), Islamabad International Airport, Islamabad, Pakistan- April 20 2012.

A microburst often causes aircraft to crash when they are attempting to land (the above-mentioned BOAC and Pan Am flights are notable exceptions). The microburst is an extremely powerful gust of air that, once hitting the ground, spreads in all directions. As the aircraft is coming in to land, the pilots try to slow the plane to an appropriate speed. When the microburst hits, the pilots will see a large spike in their airspeed, caused by the force of the headwind created by the microburst. A pilot inexperienced with microbursts would try to decrease the speed. The plane would then travel through the microburst, and fly into the tailwind, causing a sudden decrease in the amount of air flowing across the wings. The decrease in airflow over the wings of the aircraft causes a drop in the amount of lift produced. This decrease in lift combined with a strong downward flow of air can cause the thrust required to remain at altitude to exceed what is available ∎

(Article by: Air Safety Department)

WOMEN IN THE COCKPIT AND THE CONTROL TOWER

The Long And Winding Road - Women in the Cockpit And the Control Tower

Today, nobody bats an eye at the sight of a four-striper with long blond hair and lipstick hauling her flight case like her male colleagues do. Even an all female crew in the front office is common place these days. A female voice on the control frequency is also quite normal now in most of the world. But this was not always so and in some countries the going was more difficult than in others.

Even after female pilots on commercial flights were no longer a rarity, public reservations resulted in Air Inter telling the passengers of its Paris-Nimes flight on 7 February 1985 that it had been operated by an all female crew… only after they landed! This was a historic event, an absolute first in France.

Perhaps the most convoluted story comes from Hungary where girls had to put up a fierce fight to be allowed a shot at the microphone in international ATC service.

Back in the 70s and 80s Hungarian labor law had a list of professions that were not open to women. These concerned mainly work requiring a lot of physical strength but for some reason, "air traffic controller" was also among them. When asked why this should be so, some kind of weird explanation was given about women having fewer red blood cells that effectively prevented them from working in ATC. The fact that women in other countries were getting licensed and worked to everyone's satisfaction did not seem to change anything. Hungarian women, apparently, were different!

But the girls did not give up! They collected examples from other countries, looked for legal precedents and dug deep into the origins of this silly rule that prevented them from doing what they wanted to do so very much, controlling airplanes.

By the late 1970s the no-girls policy was becoming clearly untenable and some influential managers declared their support for female controllers, officially still nothing seemed to move.

In the end, the final decisive change was engineered by three girls who were allowed to attend the controller course and also to take the license exam when they finished.

In fact it was the husband of one of them who provided the proverbial straw that broke the previous system. He was a well respected aviator, chief pilot of

the flying outfit he worked at and his good ministry at all the right places brought fruit in the end. His wife and two others were on their way towards becoming controllers.

How did the female controllers fare? Most of them stayed the course, others changed to different jobs both inside and outside aviation but one thing was sure: they performed as well or sometimes better than their male colleagues, setting the basis for to-day's reality: a four striper in skirt or a female voice on the control frequency is normal… as indeed it should be.

If you have a story about female pilots or controllers, we would love to hear it, email Roshni.deo@caaf.org.fj

(Source: http:www.roger.wilco.net)

(Article by: Ground Safety Department)

FCAIR

FIJI CONFIDENTIAL AVIATION INCIDENT REPORTING

FORMS AVAILABLE ON WEBSITE

www.caaf.org.fj

OR FRONT DESK, CAAF HQ

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Your suggestions for improvements to this publication are also invited. CAAF also invites you to submit valuable information or articles that you would like to have published through this bulletin for the benefit of readers. Your name will be appropriately acknowledged. Please use the email address stated above.

THIS IS THE END

LANDING OVER-RUN ACCIDENTS CAN BE AVOIDED BY:

1. Recognising the existence of these main contributing factors, any one of which will increase landing distance considerably:

   - **Approach speed too fast**
   - **Tailwind component**
   - **Height at threshold too high**
   - **Wet and greasy surface**
   - **Obstacles on the approach**
   - **Poor braking action**

2. Deciding early whether to continue or abort the approach or landing

3. Executing immediate and correct go-around action when necessary (obstacles and terrain permitting)

4. Avoiding airstrips that are beyond the capabilities of you and your aircraft type

Civil Aviation Authority of Fiji

Promoting effective aviation safety in the Fiji Islands and the region