



CHAPTER 6

DECISION-MAKING AND HAZARDS

Many if not all outdoor activities are associated with various levels of risk. Aviation is no exception and, when analysed, the risks are generally higher than in other activities.

However, although the risk can never be eliminated, with awareness, understanding and training, many of the risks for pilots can be mitigated to an acceptable level. Where this occurs, private and general aviation can be a safe and personally rewarding activity.

Often, the factors contributing to an accident have similar themes:

- › lack of fitness to fly
- › lack of recency or competence
- › attitudes and poor decision-making.

Fatal accidents are regularly the result of:

- › loss of control
- › non-VMC flight and collision with terrain
- › mid-air collision.



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Pilot fitness

In aviation, the importance of fitness is no different to driving a car. Many aviation accidents identify fatigue or other medical factors, including physical and mental fitness, as being a contributory factor.

The IMSAFE mnemonic is useful to determine if you are physically and mentally fit and safe to fly:

- › Illness – Am I suffering any illness or symptom of an illness which might affect the safety of the flight?
- › Medication – Am I taking any medication, prescription or over the counter? Most medications come with warning that should be adhered to.
- › Stress – Am I suffering from stress? Undue stress from the psychological pressures of everyday living can be a powerful distraction and affect your performance.
- › Alcohol – Am I, or likely to be, affected by alcohol? Know the legal limits. Aside from being required to have close to a no alcohol reading during a breath test, you must not consume any alcohol within 8 hours before you fly.
- › Fatigue – Am I fatigued? Have I had sufficient sleep or rest? Insufficient sleep can affect your decision-making processes. It is your responsibility to be satisfied you are not too fatigued to fly.
- › Eating – Have I eaten properly and taken sufficient fluid so I can work effectively?



Carbon Monoxide (CO) detectors: It is strongly recommended that pilots of piston engine aircraft should wear personal CO detectors. Refer AMC GM Part 91.

Illness and medication

Common ailments such as the cold, flu or hay fever can affect your performance. Common over-the-counter medications that provide temporary relief can have further effects on your performance or fitness to fly. You should check the warning that comes with the medication. Consult your doctor as they may be able to advise of an alternative medication that is safe to use.

Stress

Outdoor activities away from your normal routine of work are often used to relieve the stresses of daily life. Flying may be such an activity, in good weather conditions. However, in a cross-country flight with passengers who are unfamiliar with light aircraft, weather conditions that are turbulent or with a marginal cloud base, the effort of maintaining VFR or coping with an airsick passenger can add to your stress level.

Alcohol

Unlike driving, the permitted level of alcohol is less than 0.02 grams in 210 litres of breath when flying or working in a safety sensitive area. In effect, consumption of alcohol by persons involved in safety sensitive aviation activities is against the law. You can be subject to random tests for alcohol and other drugs. In addition, you are not to drink any alcohol up to 8 hours before your flight. Any amount of alcohol in your body can affect your fitness to fly.

Fatigue and eating

CAO 48.1 requires that a pilot must not fly either privately or for an operator if they are, or likely to be, unfit to fly due to fatigue. Therefore, it is your responsibility to be satisfied you are not, or likely to be, fatigued when you fly. An early start after late evening work should be avoided. Be aware of the cumulative effect of fatigue. Fatigue due to periods of poor sleep over several or more nights, will not be overcome by a single night's sleep.

If you are unable to obtain food or drinks during a long day of flying, take some with you. Being hungry and dehydrated can significantly increase your fatigue.

Pilot competence

Maintaining your proficiency

While some sectors which fly under the VFR account for a high number of hours flown, the average annual hours flown by a VFR pilot in private operations is regularly less than 50 hours. Proficiency in aircraft handling skills and operating procedures can deteriorate quickly when the pilot's overall experience or flight hours are low.

To exercise the privileges of your licence for a class or type rating including any operational rating or endorsements CASR 61.385 and its associated MOS requires that you remain competent in the following:

- › operating the aircraft's navigation and operating systems
- › conducting all normal, abnormal and emergency flight procedures for the aircraft
- › applying operating limitations
- › weight and balance requirements
- › applying aircraft performance data, including take-off and landing performance data, for the aircraft.



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Therefore, maintaining your proficiency requires a conscious effort. You should:

- › Spend time reading the aircraft flight manual (AFM) and review speeds, limitations and other operating procedures for the aircraft.
- › Review and refresh operating procedures, including procedure at your local aerodrome if they are complex, such as aerodromes in D airspace. Review and refresh how to complete a weight and balance check. Review other relevant subjects such as flight planning and fuel calculations. Can I still understand NOTAMs?
- › Even when you are not flying, continue to study weather and read forecasts to understand how weather maps change from season to season and what different types of weather systems mean for the weather you are likely to experience. Do I understand what all the acronyms mean on a weather forecast?
- › Know your recency requirements. Have I completed 3 take-offs and landings in the previous 90 days, to carry a passenger? Has my flight review been completed?
- › Undertake dual instruction if you have doubt about your abilities. When did I last practise a forced landing or stall recovery?
- › When converting to a new aircraft, get ahead by studying the AFM/POH in advance. Prepare and ask questions about the aircraft systems and discuss them with your flight instructor. Don't leave your conversion flight lacking understanding of all the systems in the aircraft.

CASA conducts aviation safety seminars at various locations across the country. These are listed on the CASA website.

CASA and other organisations regularly publish other guidance material on specific subjects that are topical. Such organisations include:

- › Aircraft Owners and Operators Association
- › Recreational Aviation Association of Australia
- › Gliding Federation of Australia
- › Australian Sport Rotorcraft Association
- › Sport Aircraft Association of Australia.

Attitude

Attitude plays an important role in maintaining your proficiency. A thoughtful and cautious attitude to the hazards encountered in flying is imperative for safe flight. An indifferent attitude that results in poor decision-making has often been identified as a contributory factor to an accident.

It is important to remember:

Follow the Rules – they are usually right: The Part 91 General and operating flight rules set out the minimum limits to safety. While they may not guarantee safety, breaking them is most likely to increase your exposure to unsafe events. CASA has developed a *Plain English Guide* to help you understand and follow the rules. The guide is available from the CASA website and the online store.

Think first: Avoid impulsive actions and think before you act. Impulsive or spontaneous actions have led to actions that caused an incident or accident.

It could happen to me: Avoid complacency and be meticulous about pre-flight checks, NOTAMS and weather reports. An untold truth about aviation is that hazards treat experienced and less experienced participants equally.

Taking chances is foolish: Taking risks to impress others is foolish. Low flying over a friend's property, a take-off in poor weather or at night without the qualification has led to disaster.

Just because someone else is doing it, does that make it OK for me to do it? Many a pilot has copied other pilots' actions. Know your own mind and your own limitations. Exceeding aircraft limitations or breaking a rule is unacceptable behaviour that can lead to unsafe flight or worst, a tragedy. Please refer to the personal minimums checklist [Personal minimums checklist card – CASA Online store](#) for more information.

Decision-making

Decision-making is the act of choosing between alternatives under conditions of uncertainty. The very nature of flying and the environment means we are subject to continuous monitoring and re- evaluating. Decisions may have to be made within a tight timeframe. In every stage of the flight you must consider weather, airspace, aerodrome conditions, fuel management, expected time of arrival and so forth. Good decision-making involves risk assessment, the consideration of options that are available and acting on those options accordingly.

Knowledge and information

- › Obtain and review all the information relating to the flight. This not only includes weather and NOTAMs, but a study of the route, and aerodromes along the route.
- › Regulatory compliance does not guarantee safety but is an essential baseline for decision-making, so it is important to know the regulations relevant to your flight.
- › Develop a good understanding of your aircraft's capabilities, performance, and limitations.
- › Prepare and understand the procedures for aerodrome operations, air traffic services and airspace.
- › Consider the characteristics of different weather systems and what the implications are for your flight.
- › Identify alternative options to your plan, so early planning of possible diversion is possible if need be.
- › Re-evaluate situations when new information is available or when new factors emerge.
- › Do not discount information, just because it contradicts your existing understanding of a situation.
- › Understand the limitations of your skills and capabilities.



Mercy flights: There may be times when it is necessary for pilots to not follow aviation safety rules in order to respond to a sudden or extraordinary emergency. You are required to report such breaches to CASA. Please refer to www.casa.gov.au/operations-safety-and-travel/safety-advice/mercy-flights-and-operating-emergency.

External influences

- › Ensure you are fit to fly. Good decisions are more likely if you are not distracted by being fatigued, unwell, hungry, or dehydrated, any of which might cause you to lose concentration.
- › Unsafe situations emerge when you expose yourself to pressure to complete a flight, commonly known as ‘get-there-itis’. Avoid planning a flight where such delays due to weather or aircraft serviceability would place you in a difficult situation such as needing to return for an important work meeting.
- › You need to understand the limitations of flying in light aircraft and why it is sometimes not safe to fly due to weather or aircraft serviceability issues.

Avoiding distractions

Being distracted during a critical phase of a flight could cause you to neglect controlling the aircraft. These may include:

- › Attempting to shut open doors or canopies while close to the ground soon after take-off.
- › Attempting to diagnose certain cockpit warnings or other system issues during the approach and landing phase of a flight.
- › Passengers talking or being disruptive through critical phases of a flight.
- › Pressure from deadlines you need to meet.

Issues such as open doors or warning lights, except for a landing gear warning light, can normally wait until the aircraft is at a safe altitude when your attention can be given to resolving them.

In the case of landing gear warning lights, go around and resolve the issue at a safe altitude and out of the circuit area.

Time and capacity

- › Give yourself time to review information free from distractions when making pre-flight decisions. Give yourself extra time to account for things such as passengers or potential aerodrome-related delays. Avoid flying under time pressure.
- › Make decisions in good time. Be wary of delaying decisions such as whether to divert due to weather on the basis that you can wait and see what happens. You may miss the window of opportunity to ensure a safe outcome.
- › In the air, think ahead of the position of the aircraft so that you can anticipate what decisions will have to be made, such as what type of circuit to join to conduct at your destination or whether to ask for a transit of controlled airspace.
- › Anticipate and control developments in the flight rather than simply reacting to them. For example, use time in the cruise phase of the flight, to think something through, when you have less issues to cope with.

Experience

- › As you broaden your experience, your understanding of how to interpret situations should improve. As you take on more challenging flights you will need to balance this with an appropriately cautious attitude and take advice if you are unsure of something.
- › As you gain experience you will need to avoid the traps of experience such as complacency or the reinforcement of risky behaviour.
- › Close calls can be intimidating. You may be able to get away with flying in bad weather or using a short runway; however, you need to reflect on the fact that you may not be so lucky next time.
- › Always keep learning from the experiences and mistakes of others. The ATSB publishes experiences and mistakes of others as part of their accident investigation reports. These reports and other research material can be found on their website: www.atsb.gov.au.
- › CASA produces **Flight Safety Australia** magazine that features articles on decision-making scenarios and other matters of aviation safety.

Improving your decision-making

If you are aware of common decision-making traps you can fall into it can help mitigate error. Some of these traps are:

- › jumping to assumptions or conclusions
- › not considering all available options
- › not communicating with others
- › complacency
- › assuming you don't have time
- › failing to consult
- › failing to evaluate and review.

You cannot improvise a good decision; you must prepare for it. You will make better timelier final decisions if you have considered all the options in advance.

In summary:

- › Give yourself time to review information free from distractions when making pre-flight decisions. Give yourself extra time to account for factors such as passengers or potential aerodrome-related delays. Avoid flying under time pressure.
- › In the air, think ahead of the position of the aircraft so you can anticipate what decisions will have to be made, such as obtaining weather from the AWIS, considering what type of circuit join to conduct at your destination and completing checklists.
- › Anticipate and control developments in the flight rather than simply reacting to them. For example, use time in the cruise phase of the flight, when you have less pressure, to review the aerodrome information and weather as you prepare for landing.
- › In the event of an emergency, land at the nearest suitable aerodrome, avoid deviating from the trained procedures and follow the aircraft emergency checklist and procedures. Don't delay in calling ATS for assistance.
- › Where possible advise others of your plans before you act. This increases the chances of successful follow through on your decision and ensures people are not caught unawares.
- › When time is not so critical, involve others in the decision-making. That way everybody is more invested in the decision and therefore likely to be more motivated to support it.

Hazards

Loss of control

Loss of control accidents that occur during the approach and landing, take-off and initial climb phases of flight are often the result of the unrecognised stall and subsequent spin. Any uncontrolled flight, even from a low altitude to the ground, will generally result in a fatal accident.

Poor speed control and turning back to the runway in the event of an engine failure are consistent themes leading to these accidents.

Turbulence and crosswinds during take-off or landing can be challenging and can lead to the aircraft departing the runway. These incidents or accidents are generally the result of poor handling technique and speed control.

To fly the aircraft safely, you will need to remain proficient, know the aircraft and understand its limitations. You must:

- › remain proficient in slow flight and stall recognition and recovery techniques
- › understand that landing in crosswinds and/or turbulent conditions requires proficiency. Undertake training with an instructor if you feel your proficiency is not being maintained.
- › know the Pilot Operating Handbook limitations, including the correct speeds in all phases of flight, including stall (clean and with flap) and best glide
- › remember the stall speed increases as the G-loading increases. An aircraft that stalls at 50 kts in level flight will stall at approximately 70 kts in a 60-degree turn.
- › know your aircraft's performance limitations to ensure you have sufficient runway available and obstacle clearance during approach or climb out
- › apply a safety buffer or margin to the determined take-off or landing distances from the Pilot Operating Handbook to allow for pilot performance, runway conditions, slope or other factors
- › understand the amount of turbulence or crosswind that can make speed control and touchdown precision much more challenging
- › know that judging height and distance when the sun is low can often make touchdown challenging.

VFR flight into IMC

The dangers of VFR pilots flying into IMC have been recognised for a very long time, yet they still fly into deteriorating weather and IMC.

Pilot decision-making, particularly regarding weather and flight, is often complex; however, the solution to avoiding VFR into IMC when weather is marginal before take-off is not to depart. During flight, it is to turn back or divert before it becomes impossible to do so.

Accidental flight into cloud can be prevented by always ensuring you have a defined horizon above the terrain and below the cloud and, when this is not the case, deciding early to turn back or divert.

Mid-air collisions

Unfortunately, there is at least one mid-air collision in Australia every 10 years. Almost all mid-air collisions occur in good weather and visibility at relatively low level. Around half of mid-air collisions happen near aerodromes, with many in the circuit.

As aviation developed, with increasing aircraft performance, traffic density and flight in non-visual conditions, it became apparent that unalerted see-and-avoid had significant limitations. The need to enhance a pilot's situational awareness led to the principle of 'alerted see-and-avoid'.

The primary tool of alerted see-and-avoid that is common across aviation—from sport and recreational to air transport—is radio communication. Radio allows for the communication of information (in this instance traffic information) to the pilot from the ground (Air Traffic Services) or from other aircraft.

See CASA AC 91.14 – Pilots' responsibility for collision avoidance – which provides detailed guidance on the limitation of see-and-avoid and AC 91.10 – Operations at non-controlled aerodromes. These ACs provide practical information about collision avoidance when flying in the vicinity of a non-controlled aerodrome.

Further reading

Safety Behaviours: Human Factors for Engineers resource kit | Civil Aviation Safety Authority (casa.gov.au)

casa.gov.au/spin-avoidance-and-stall-recovery-training

casa.gov.au/guidelines-aeroplanes-mtow-not-exceeding-5-700-kg-suitable-places-take-and-land Guidelines for aeroplanes with MTOW not exceeding 5,700 kg – suitable places to take-off and land

casa.gov.au/download/operations-vicinity-non-controlled-aerodromes-0
Operations in the vicinity of non-controlled aerodromes

casa.gov.au/download/pilots-responsibility-collision-avoidance
Pilots' responsibility for collision avoidance

casa.gov.au/guidelines-aircraft-fuel-requirements-0
Guidelines for aircraft fuel requirements

CASA Search Centre **casa.gov.au/search-centre**

casa.gov.au/fuel-and-oil-safety Fuel and oil safety

casa.gov.au/guidelines-helicopters-suitable-places-take-and-land
Guidelines for helicopters – suitable places to take-off and land

casa.gov.au/wake-turbulence Wake turbulence