

Gliding Australia Training Manual

Trainer Guide



Unit 24

Human Factors and Pilot Limitations

Unit 24 - Human Factors & Pilot Limitations

AIM

To develop the Skills and Knowledge to:

- Describe the non-technical skills and knowledge that underpin all GPC units and aviation activity;
- Assess the impact of Human Factors on operations of an aircraft; and
- Develop personal limitations on operating aircraft.

WHAT ARE THE PRE-REQUISITES FOR THIS UNIT?

- Nil

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 25 Threat and Error Management

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Self-assessment of fitness to fly.	• Demonstrate: ○ An assessment of daily medical fitness using the IMSAFE mnemonic.
2. Hazardous Attitudes (HAZATTS) and strategies to counter them.	• Describe: ○ the five HAZATTS. ○ the strategies to counter the HAZATTS.
3. Describe a Model of aviation decision making.	• Describe: ○ The difference between fast and slow decision thinking. ○ The aviation decision making (ADM) model using the mnemonic of DECIDE. • Demonstrate: ○ The use of an ADM model in aviation activities.
4. Additional factors that affect pilot performance.	• Describe: • Effects of: ○ Eyesight limitations. ○ Ear problems. ○ "G" forces. ○ Oxygen in flight operations.

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5. Factors of Airmanship.	● Describe: ● Bedrock Principles: ○ Discipline. ○ Skills. ○ Proficiency using currency barograph diagram. ● Pillars of Knowledge: ○ Self. ○ Aircraft. ○ Team. ○ Environment. ○ Risk. ● Capstone Outcomes: ○ Situational Awareness. ● Judgement.
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KEY MESSAGES

More than 75% of incidents/accidents are attributed to human factors:

- All pilots are affected by human factors issues that can become threats to safe aviation.
- All pilots must learn to recognise and mitigate these issues in themselves and others as part of their TEM actions.
- HF issues are physical, cognitive and interpersonal.

LESSON PLANNING AND CONDUCT

It is recommended that the theory involved with this unit be split and delivered in several sessions.

This could be delivered as on-line sessions, part of a ground school or on non-flying days due to weather.

A GFA PowerPoint is available to assist in presenting this unit (see Theory courses) and the *GFA Human Factors for Gliding* is available on the GFA Website under Safety/Reference Materials.

BRIEFING

Fitness to Fly

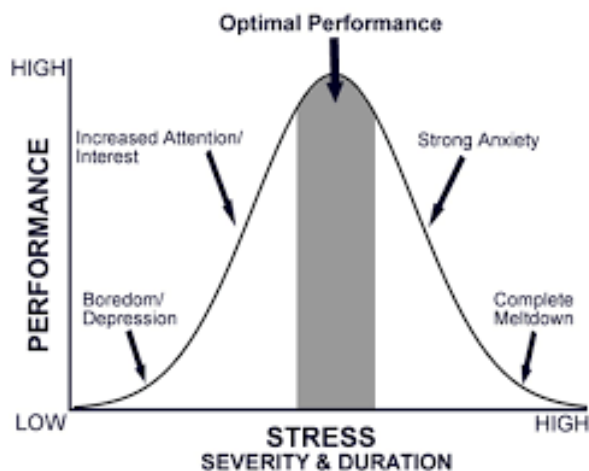
Medical fitness to fly is not just a doctor's assessment, it is beholden on every pilot to self-assess their fitness to fly before and during each flight. The following mnemonic is an aid to that self-assessment:

IMSAFE

- Illness:

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- Have I any illness that can affect my performance in flight? e.g., Colds may block sinuses leading to eardrum pain and damage.
- Do I feel unwell?
- Medication / Drugs:
 - Am I taking any prescribed or over the counter meds or drugs that can affect my performance in flight? eg Pain killers, codeine, anti-histamine, beta-blockers.
 - CASA Drug and alcohol testing.
 - Air Sports Australia Confederation Anti-Drug Policy.
- Stress:



- - Underload.
 - Optimum (Eustress).
 - Overload (Distress).
 - Where personal problems fit.
- Alcohol:
 - Legal limitation.
 - 8 hours between bottle and throttle may not be enough after heavy alcohol consumption.
- Fatigue:
 - Adequate rest and sleep.
 - Long flights/ days.
 - Accumulation of fatigue over time (sleep debt).
- Eating:
 - Healthy and regular diet.
 - Hydration.

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- Glucose control throughout flights.

The 5 Hazardous Attitudes All Pilots Should Avoid

Anti-authority ("Don't tell me!") - Don't like anyone telling them what to do. Resentful of rules & regulations.

- Antidote: Follow the rules, they're usually right (and written in blood!)

Impulsivity ("Do something - do it now!") - Need to do something, anything, quickly. Don't stop to think about better alternatives.

- Antidote: Not so fast... think first.

Invulnerability ("It won't happen to me.") - Accidents happen to other people, not to me. Therefore, I can take chances.

- Antidote: Consider that it could happen to me.

Macho ("I can do it.") - Always trying to prove themselves better than others. Take risks and try to impress others.

- Antidote: Taking chances is foolish.

Resignation ("What's the use?") - I really can't make a difference. It is going to happen anyway, why bother? Leave it to others.

- Antidote: I'm not helpless, I can make a difference. Never give up.

Aviation Decision Making (ADM) Model

The accuracy of fast decisions may be improved with preparation and prior deliberation, for example choices about launch-failure options during the pre-take-off check.

Decision making is divided into Fast (instinctive) and Slow (deliberate) thinking models. Pilots need to know when to use each system.

Fast thinking is useful in emergencies and when decisions must be made quickly, generally from predetermined options (such as launch emergencies or spin recovery). Slow thinking is useful for deliberate decision making where time is available to consider different options and outcomes.

DECIDE

A formal model (based on the mnemonic 'DECIDE') is used to provide structured decision making that encourages deliberate decision-making.

- **Detect** – the fact that a change has occurred.
- **Estimate** – the need to react to or counter the change.
- **Choose** – a desirable outcome for the flight or situation.
- **Identify** – actions to control the change successfully.
- **Do** – take the necessary actions.
- **Evaluate** – the effects of the action to react to or counter the initial change.

Additional Human limitations

Discuss the following items with reference to GFA Human Factors for Gliding.

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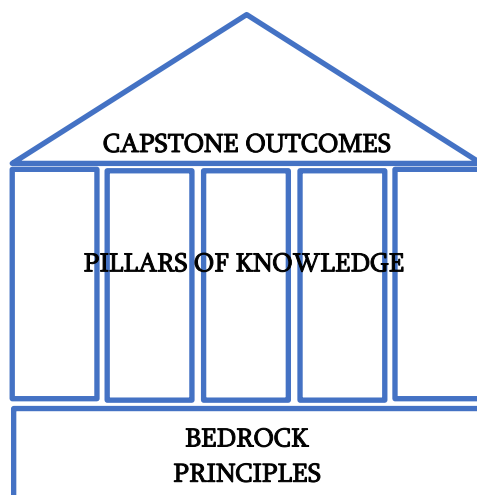
- Eyesight:
 - Limits;
 - Spectacles usage;
 - Sun glasses.
- Ears:
 - Vertigo;
 - Eardrums;
 - Sinus blockage.
- “G” forces:
 - “G” increase in turns/aerobatics;
 - “G” induced Loss of Consciousness (GLOC);
 - Sub-gravity (i.e. 0-1 G) testing.
- Oxygen:
 - Hypoxia with altitude;
 - Legal requirements.

AirManShip (an easy proword)

- AIR –good aviators that have good technical skills.
- MAN (kind) – people that can be an inspiration to their students and provide quality instruction.
- SHIP – personnel that respect the aircraft and work within the systems that support them.

To be practiced both in the air and on the ground.

Airmanship is like a building:



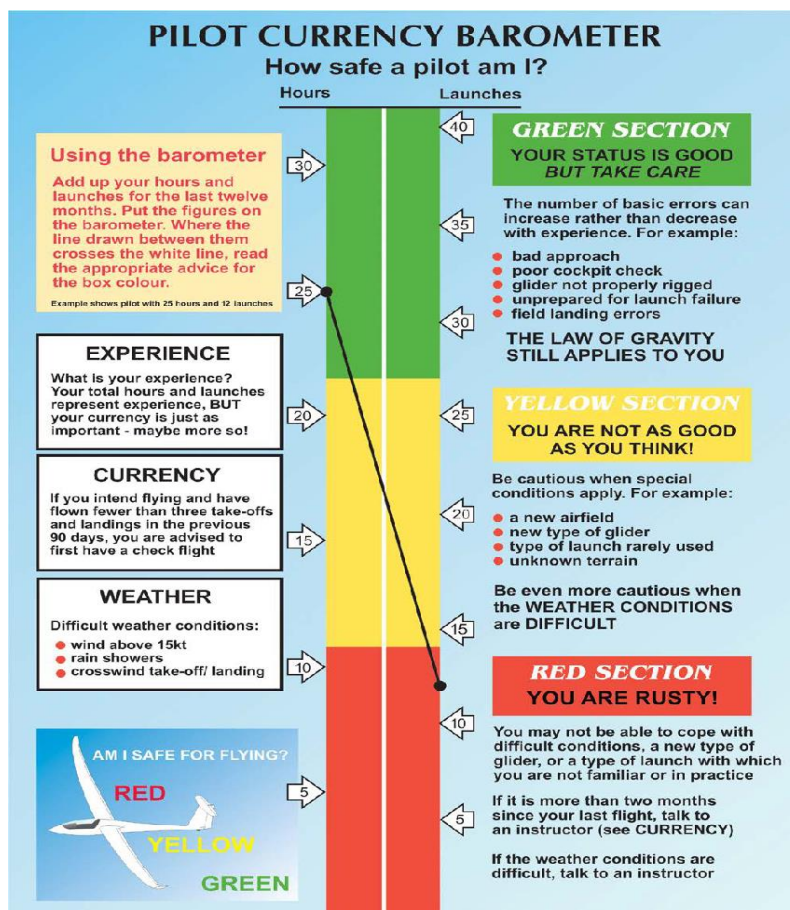
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- Capstone Outcomes:
 - Situational awareness:
 - PERCEPTION - What is happening?
 - COMPREHENSION - What does it mean?
 - PROJECTION - Projecting what might happen in the future? I.e. Getting ahead of the situation.
- Judgement:
 - Using skills, knowledge, experience and intelligence to analyse a situation and decide a course of action.
- Pillars of Knowledge:
 - Self.
 - Aircraft.
 - Team.
 - Environment.
 - Risk.
- Bedrock principles:
 - Discipline.
 - Skills.
 - Proficiency.

Pilot Currency

Discuss Skills and Proficiency associated with Pilot Currency.

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FLIGHT EXERCISES

Apart from demonstrating the performance standards, specific inflight demonstration and practice are not required, this is an underpinning theory unit.

Choose appropriate occurrences from the Occurrence Summaries on the GFA website to analyse for Human Factors.

Student should demonstrate and identify human factors affecting them pre, during and post flight.

Advice to Instructors regarding their responsibility to maintain safe flight.

Identify when the student's performance is affected by human factors and take action to mitigate the factors affecting the safety of the operation.

Notes:

- The theory in this unit should be given relevant context and practical examples, and/ or reference to appropriate SOAR occurrence reports.

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COMMON PROBLEMS

Problem	Probable Cause
Student does not recognise a medical condition such as fatigue, hydration, illness.	Student's eagerness to fly is biasing other judgement. Discuss their feeling and potential issues with flight, potentially reschedule sortie.
Student exhibits one of the HAZATTs during training.	Student may not be aware of HAZATT or may be copying behaviours noted from other members. Reiterate the need to continually assess our attitudes and behaviours to prevent creeping erosion of standards.

THREAT AND ERROR MANAGEMENT

- Errors arising out of human factors must be detected, estimate the alternatives, choose the best course of action, do it, then evaluate the action.
- Such errors must not be allowed to result in undesired aircraft states (UAS).

TRAINING MATERIALS AND REFERENCES

- GPC Pilot Guide Unit 24
- GFA Human Factors for Gliding OPS0010
- Occurrence Summaries on the GFA website under Documents/Forms /Operations

The following are recommended further reading on the subject:

- Aviation Decision Making: FAA Advisory Circular 60-22 1991
- Flight Discipline: Tony Kern February 1998
- CASA Human Factors in sport, recreation and general aviation Course (<https://www.casa.gov.au/education/elearning-catalogue>)
- Introduction to the Generic Pilot Proficiency Program: Mark W Riley: Aviation Safety Foundation Australasia (ASFA) 2007
- Risky Business: WA Department of Local Government, Sport and Cultural Industries, Website 2020
- Safe Work Australia website glossary 2020
- Safety Management Kit: Booklet 3: Safety Risk Management: CASA December 2014
- SKYbrary website Eurocontrol: 2020