RPL Training Notes

Version 11 – 2018

NAME:___________________________________

ARN:____________________________________

Australian Pilot Training Alliance Pty. Ltd.

Thanks to all the APTA Personnel who made this Book Possible.

Table of Contents

List of Figures

List of Tables

1 Preparation for Flight

1.1 Objective

To consider and recognise the importance of pre-flight preparation and understand the responsibilities of the pilot in command to permit the safe execution of any flight exercise.

1.2 Application

Applied to all facets of flight, it is executed with the primary aim of recognising and “pre” managing all potential threats and errors of the upcoming exercise. With the additional benefit of providing a clear expectation of upcoming events to minimising potential confusion.

1.3 Physical and Mental Wellbeing

The pilot is responsible for operating the aircraft. Therefor a healthy state of body and mind are critical prior to proceeding with any flight.

Elements to consider prior to flight:

- Have I had adequate rest prior to flight?
- Have I had alcohol within 8 hours of flight?
- Am I likely to suffer from impairment due to drugs or pills?
- Am I aware of & do I comply with the drug and alcohol requirements from DAMP/CASR 99 Do I suffer from any upper respiratory complaint?
- Do I feel competent enough to perform all duties associated with this particular flight?

1.4 Pilot Documentation

In the early phases of pilot training the instructor will take responsibility for many factors not apparent to the trainee however it will quickly become important to consider such things as:

- Do I have a current licence and medical?
- Are all my maps and charts current?
- Is my AIP current and amended?
- Does my log book indicate that I meet recency requirements?
- Have I made a study of current forecast and NOTAMS?

1.5 Aircraft Documentation

Before an aircraft can be flown it must meet stringent airworthiness requirements. Much of the documentation is controlled by maintenance authorities and not readily available to the pilot.

However, the pilot must check certain documents prior to each flight as follows:

1.5.1 Maintenance Release

Check prior to every flight that the flight can be completed without running over due times for scheduled maintenance. Check for any unserviceability and that the certification of a daily inspection has been indicated in the release.

1.5.2 Aircraft Flight Manual

Each aircraft must have a flight manual on board. It contains information on the engine, propeller, fuel and oil capacity, instrumentation, weight and balance, take-off and landing performance, airspeed limitations and emergency procedures.

Each flight manual is specific to the particular aircraft and cannot be used for a similar aircraft.

1.5.3 Certificate of Airworthiness

Issued indefinitely provided the aircraft is maintained in accordance with the relevant civil aviation regulations. A valid maintenance release indicates those requirements have been met.

1.5.4 Certificate of Registration

Indicates the aircraft has been entered in the Australian register of aircraft.

1.5.5 Flying School Documentation

The conduct of any flight is the responsibility of the pilot in command. However, it is the responsibility of the training organisation to set the requirements for flight conduct and the pilot is obliged to abide by them. The relevant documents a pilot must be familiar with are:

1.5.6 Company Operations Manual

Contains information on conduct of operations, specific aircraft operating procedures, training and checking, specialised operations and procedures and standards for flying school operations.

1.5.7 Flight Authorisation Sheet

Signature of the pilot is his agreement to conduct the flight according to the company operations manual.

1.5.8 Flight Record

To be completed at the end of the flight to indicate start up and shut down times and landing points.

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2 Daily and Pre-Flight Inspection

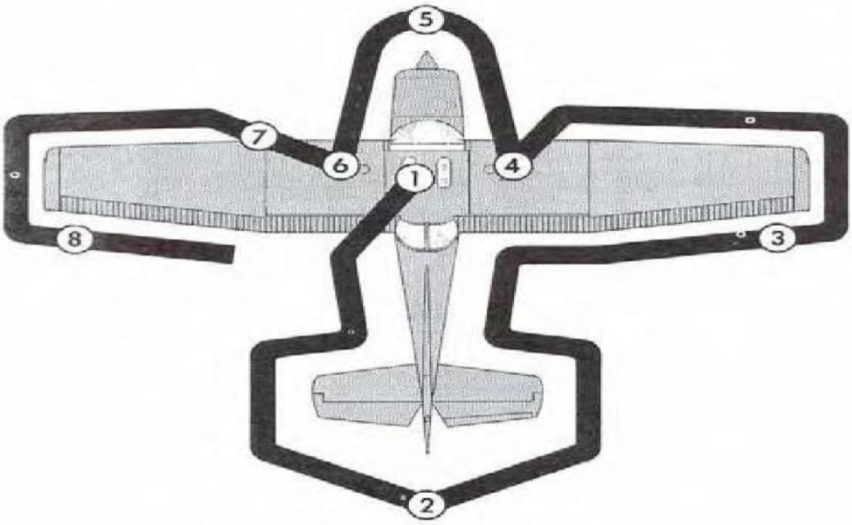
2.1 Introduction

With reference to Pilot Operating Handbook (POH) and CAR Schedule 5.

2.1.1 Examples

Examples of POH extract appear on the following pages.

Figure 2-1 Cessna Model 152 Normal Procedures



NOTE

Visually check airplane for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to flight, check that pitot heater (if installed) is warm to touch within 30 seconds with battery and pitot heat switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available.

Figure 4-1. Preflight Inspection

Figure 2-2 Cessna Model 152 Normal Checklist Procedures

CESSNA
MODEL 152

SECTION 4
NORMAL PROCEDURES

CHECKLIST PROCEDURES

PREFLIGHT INSPECTION

(1) CABIN

1. Pilot's Operating Handbook -- AVAILABLE IN THE AIRPLANE.
2. Control Wheel Lock -- REMOVE.
3. Ignition Switch -- OFF.
4. Master Switch -- ON.

WARNING

When turning on the master switch, using an external power source, or pulling the propeller through by hand, treat the propeller as if the ignition switch were on. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

5. Fuel Quantity Indicators -- CHECK QUANTITY.
6. Master Switch -- OFF.
7. Fuel Shutoff Valve -- ON.

(2) EMPENNAGE

1. Rudder Gust Lock -- REMOVE.
2. Tail Tie-Down -- DISCONNECT.
3. Control Surfaces -- CHECK freedom of movement and security.

(3) RIGHT WING Trailing Edge

1. Aileron -- CHECK freedom of movement and security.

(4) RIGHT WING

1. Wing Tie-Down -- DISCONNECT.
2. Main Wheel Tire -- CHECK for proper inflation.
3. Before first flight of the day and after each refueling, use sampler cup and drain small quantity of fuel from fuel tank sump quick-drain valve to check for water, sediment, and proper fuel grade.
4. Fuel Quantity -- CHECK VISUALLY for desired level.
5. Fuel Filler Cap -- SECURE.

1 July 1979 4-5

Figure 2-3 Cessna Model 152 Continued...

SECTION 4
NORMAL PROCEDURES

CESSNA
MODEL 152

(5) NOSE

1. Engine Oil Level -- CHECK, do not operate with less than four quarts. Fill to six quarts for extended flight.
2. Before first flight of the day and after each refueling, pull out strainer drain knob for about four seconds to clear fuel strainer of possible water and sediment. Check strainer drain closed. If water is observed, the fuel system may contain additional water, and further draining of the system at the strainer, fuel tank sumps, and fuel line drain plug will be necessary.
3. Propeller and Spinner -- CHECK for nicks and security.
4. Carburetor Air Filter -- CHECK for restrictions by dust or other foreign matter.
5. Landing Light(s) -- CHECK for condition and cleanliness.
6. Nose Wheel Strut and Tire -- CHECK for proper inflation.
7. Nose Tie-Down -- DISCONNECT.
8. Static Source Opening (left side of fuselage) -- CHECK for stoppage.

(6) LEFT WING

1. Main Wheel Tire -- CHECK for proper inflation.
2. Before first flight of day and after each refueling, use sampler cup and drain small quantity of fuel from fuel tank sump quick-drain valve to check for water, sediment and proper fuel grade.
3. Fuel Quantity -- CHECK VISUALLY for desired level.
4. Fuel Filler Cap -- SECURE.

(7) LEFT WING Leading Edge

1. Pitot Tube Cover -- REMOVE and check opening for stoppage.
2. Stall Warning Opening -- CHECK for stoppage. To check the system, place a clean handkerchief over the vent opening and apply suction; a sound from the warning horn will confirm system operation.
3. Fuel Tank Vent Opening -- CHECK for stoppage.
4. Wing Tie-Down -- DISCONNECT.

(8) LEFT WING Trailing Edge

1. Aileron -- CHECK freedom of movement and security.

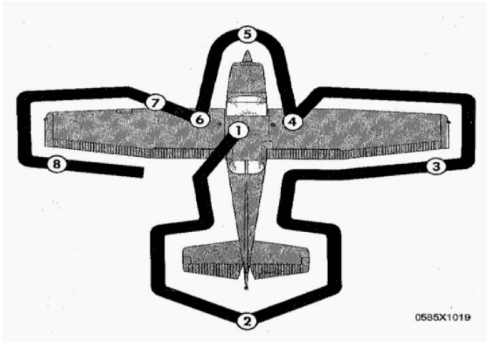
BEFORE STARTING ENGINE

1. Preflight Inspection -- COMPLETE.

4-6

1 July 1979

Figure 2-4 Cessna Model 172R – Checklist/Pre-Flight



CHECKLIST PROCEDURES

PREFLIGHT INSPECTION

(1) CABIN

1. Pitot Tube Cover -- REMOVE. Check for pitot blockage.
2. Pilot's Operating Handbook -- AVAILABLE IN THE AIRPLANE.
3. Airplane Weight and Balance -- CHECKED.
4. Parking Brake -- SET.
5. Control Wheel Lock -- REMOVE.
6. Ignition Switch -- OFF.
7. Avionics Master Switch -- OFF.

WARNING

WHEN TURNING ON THE MASTER SWITCH, USING AN EXTERNAL POWER SOURCE, OR PULLING THE PROPELLER THROUGH BY HAND, TREAT THE PROPELLER AS IF THE IGNITION SWITCH WERE ON. DO NOT STAND, NOR ALLOW ANYONE ELSE TO STAND, WITHIN THE ARC OF THE PROPELLER, SINCE A LOOSE OR BROKEN WIRE OR A COMPONENT MALFUNCTION COULD CAUSE THE PROPELLER TO ROTATE.

8. Master Switch -- ON.
9. Fuel Quantity Indicators -- CHECK QUANTITY and ENSURE LOW FUEL ANNUNCIATORS (L LOW FUEL R) ARE EXTINGUISHED.
10. Avionics Master Switch -- ON.
11. Avionics Cooling Fan -- CHECK AUDIBLY FOR OPERATION.
12. Avionics Master Switch -- OFF.
13. Static Pressure Alternate Source Valve -- OFF.
14. Annunciator Panel Switch -- PLACE AND HOLD IN TST POSITION and ensure all annunciators illuminate.

Figure 2-5 Cessna Model 172R – Checklist/Pre-Flight (Continued)

15. Annunciator Panel Test Switch -- RELEASE. Check that appropriate annunciators remain on.

NOTE

When Master Switch is turned ON, some annunciators will flash for approximately 10 seconds before illuminating steadily. When panel TST switch is toggled up and held in position, all remaining lights will flash until the switch is released.

16. Fuel Selector Valve -- BOTH.
17. Fuel Shutoff Valve -- ON (Push Full In).
18. Flaps -- EXTEND.
19. Pitot Heat -- ON. (Carefully check that pitot tube is warm to the touch within 30 seconds.)
20. Pitot Heat -- OFF.
21. Master Switch -- OFF.
22. Elevator Trim -- SET for takeoff.
23. Baggage Door -- CHECK, lock with key.
24. Autopilot Static Source Opening (if installed) -- CHECK for blockage.

2 EMPENNAGE

1. Rudder Gust Lock (if installed) -- REMOVE.
2. Tail Tie-Down -- DISCONNECT.
3. Control Surfaces -- CHECK freedom of movement and security.
4. Trim Tab -- CHECK security.
5. Antennas -- CHECK for security of attachment and general condition.

3 RIGHT WING Trailing Edge

1. Aileron -- CHECK freedom of movement and security.
2. Flap -- CHECK for security and condition.

4 RIGHT WING

1. Wing Tie-Down -- DISCONNECT.

Figure 2-6 Cessna Model 172R – Checklist/Pre-Flight (Continued)

2. Main Wheel Tire -- CHECK for proper inflation and general condition (weather checks, tread depth and wear, etc...).
3. Fuel Tank Sump Quick Drain Valves -- DRAIN at least a cupful of fuel (using sampler cup) from each sump location to check for water, sediment, and proper fuel grade before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points until **all** contamination has been removed. If contaminants are still present, refer to WARNING below and do not fly airplane.

WARNING

IF, AFTER REPEATED SAMPLING, EVIDENCE OF CONTAMINATION STILL EXISTS, THE AIRPLANE SHOULD NOT BE FLOWN. TANKS SHOULD BE DRAINED AND SYSTEM PURGED BY QUALIFIED MAINTENANCE PERSONNEL. ALL EVIDENCE OF CONTAMINATION MUST BE REMOVED BEFORE FURTHER FLIGHT.

4. Fuel Quantity -- CHECK VISUALLY for desired level.
5. Fuel Filler Cap -- SECURE and VENT UNOBSTRUCTED.

5 NOSE

1. Fuel Strainer Quick Drain Valve (Located on bottom of fuselage) -- DRAIN at least a cupful of fuel (using sampler cup) from valve to check for water, sediment, and proper fuel grade before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points, including the fuel reservoir and fuel selector, until **all** contamination has been removed. If contaminants are still present, refer to WARNING above and do not fly the airplane.

Figure 2-7 Cessna Model 172R – Checklist/Pre-Flight (Continued)

2. Engine Oil Dipstick/Filler Cap -- CHECK oil level, then check dipstick/filler cap SECURE. **Do not operate with less than five quarts.** Fill to eight quarts for extended flight.
3. Engine Cooling Air Inlets -- CLEAR of obstructions.
4. Propeller and Spinner -- CHECK for nicks and security.
5. Air Filter -- CHECK for restrictions by dust or other foreign matter.
6. Nose Wheel Strut and Tire -- CHECK for proper inflation of strut and general condition (weather checks, tread depth and wear, etc...) of tire.
7. Left Static Source Opening -- CHECK for blockage.

6 LEFT WING

1. Fuel Quantity -- CHECK VISUALLY for desired level.
2. Fuel Filler Cap -- SECURE and VENT UNOBSTRUCTED.
3. Fuel Tank Sump Quick Drain Valves -- DRAIN at least a cupful of fuel (using sampler cup) from each sump location to check for water, sediment, and proper fuel grade before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points until **all** contamination has been removed. If contaminants are still present, refer to WARNING on page 4-9 and do not fly airplane.
4. Main Wheel Tire -- CHECK for proper inflation and general condition (weather checks, tread depth and wear, etc...).

7 LEFT WING Leading Edge

1. Fuel Tank Vent Opening -- CHECK for blockage.
2. Stall Warning Opening -- CHECK for blockage. To check the system, place a clean handkerchief over the vent opening and apply suction; a sound from the warning horn will confirm system operation.
3. Wing Tie-Down -- DISCONNECT.
4. Landing/Taxi Light(s) -- CHECK for condition and cleanliness of cover.

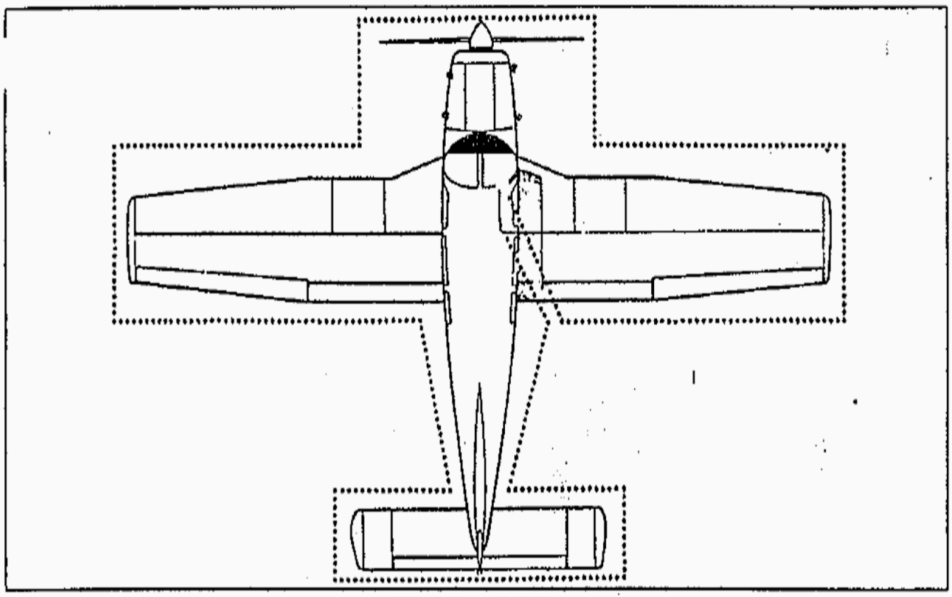
8 LEFT WING Trailing Edge

1. Aileron-- CHECK for freedom of movement and security.
2. Flap -- CHECK for security and condition.

Figure 2-8 Example POH Extract – PA28

PIPER AIRCRAFT CORPORATION
PA-28-161, CHEROKEE WARRIOR II

SECTION 4
NORMAL PROCEDURES



WALK-AROUND

Figure 4-1

NORMAL PROCEDURES CHECK LIST

PREFLIGHT CHECK

Control wheel .... release belts
Avionics .... OFF
Master switch .... ON
Fuel quantity gauges .... check
Master switch .... OFF
Ignition .... OFF
Exterior .... check for damage
Control surfaces .... check for interference - free of ice, snow, frost
Hinges .... check for interference
Wings .... free of ice, snow, frost
Stall warning .... check
Tie down and chocks .... remove
Navigation lights .... check
Fuel tanks .... check supply visually - secure caps
Fuel tank sumps .... drain
Fuel vents .... open
Main gear struts .... proper inflation (4.50 in.)
Tires .... check
Brake blocks .... check
Pitot head .... remove cover - holes clear
Windshield .... clean
Propeller and spinner .... check
Fuel and oil .... check for leaks
Oil .... check level
Dipstick .... properly seated
Cowling .... secure
Inspection covers .... secure
Nose wheel tire .... check
Nose gear strut .... proper inflation (3.25 in.)
Air inlets .... clear
Alternator belt .... check tension
Tow bar and control locks .... stow
Baggage .... stowed properly - secure
Baggage door .... close and secure
Fuel strainer .... drain
Primary flight controls .... proper operation
Cabin door .... close and secure
Required papers .... on board
Seat belts and harness .... fasten/adjust-check inertia reel

2.2 CAR Schedule 5

Part 1 Daily Inspection

1.1 An inspection (in this Part called a daily inspection) must be carried out on the aircraft before the aircraft's first flight on each day on which the aircraft is flown.

1.2 A daily inspection must consist of the making of such of the checks set out in the table at the end of this Part as are applicable to the aircraft

Table of checks included in a daily inspection Section 1 General

1. Check that the ignition switches are off, the mixture control is lean or cut off, the throttle is closed and the fuel selector is on.
2. Check that the propeller blades are free from cracks, bends and detrimental nicks, that the propeller spinner is secure and free from cracks, that there is no evidence of oil or grease leakage from the propeller hub or actuating cylinder and that the propeller hub, where visible, has no evidence of any defect which would prevent safe operation.
3. Check that the induction system and all cooling air inlets are free from obstruction.
4. Check that the engine, where visible, has no fuel or oil leaks and that the exhaust system is secure and free from cracks.
5. Check that the oil quantity is within the limits specified by the manufacturer for safe operation and that the oil filler cap, dipstick and inspection panels are secure.

Check that the engine cowlings and cowl flaps are secure.

Schedule 5 CASA maintenance schedule Part 1 Daily inspection

6. Check that the landing gear tyres are free from cuts or other damage, have no plies exposed and, by visual inspection, are adequately inflated.
7. Check that the landing gear oleo extensions are within normal static limits and that the landing gear doors are secure.
8. Check that the wing and fuselage surfaces are free from damage and that the inspection panels, flight control surfaces and flight control devices are secure.
9. Check that the interplane and centre section struts are free from damage and that the bracing wires are of the correct tension.
10. Check that the pitot heads and static ports are free from obstruction and that the pitot cover is removed or is free to operate.
11. Check that the fuel tank filler caps, chains, vents and associated access panels are secure and free from damage.

12. Check that the empennage surfaces are free from damage and that the control surfaces control cables and control rods, where visible, are secure.
13. Check that the canard surfaces are free from damage and that the control surfaces, control cables and control rods, where visible, are secure.
14. Check that the flight controls, the trim systems and the high lift devices operable from the ground have full and free movement in the correct sense.
15. Check that the radios and antennae are secure and that where visible, radio units and internal wiring are secure.
16. Check that the drain holes are free from obstruction.
17. Check that there is no snow, frost or ice on the wings, tail surfaces, canards, propeller or windscreen.
18. Check that each tank sump and fuel filter is free from water and foreign matter by draining a suitable quantity of fuel into a clean transparent container.

CASA maintenance schedule Schedule 5 Periodic inspection Part 2

19. Check that the windscreen is clean and free from damage.
20. Check that the instruments are free from damage, legible and secure.
21. Check that the seat belts, buckles and inertia reels are free from damage, secure and functioning correctly.

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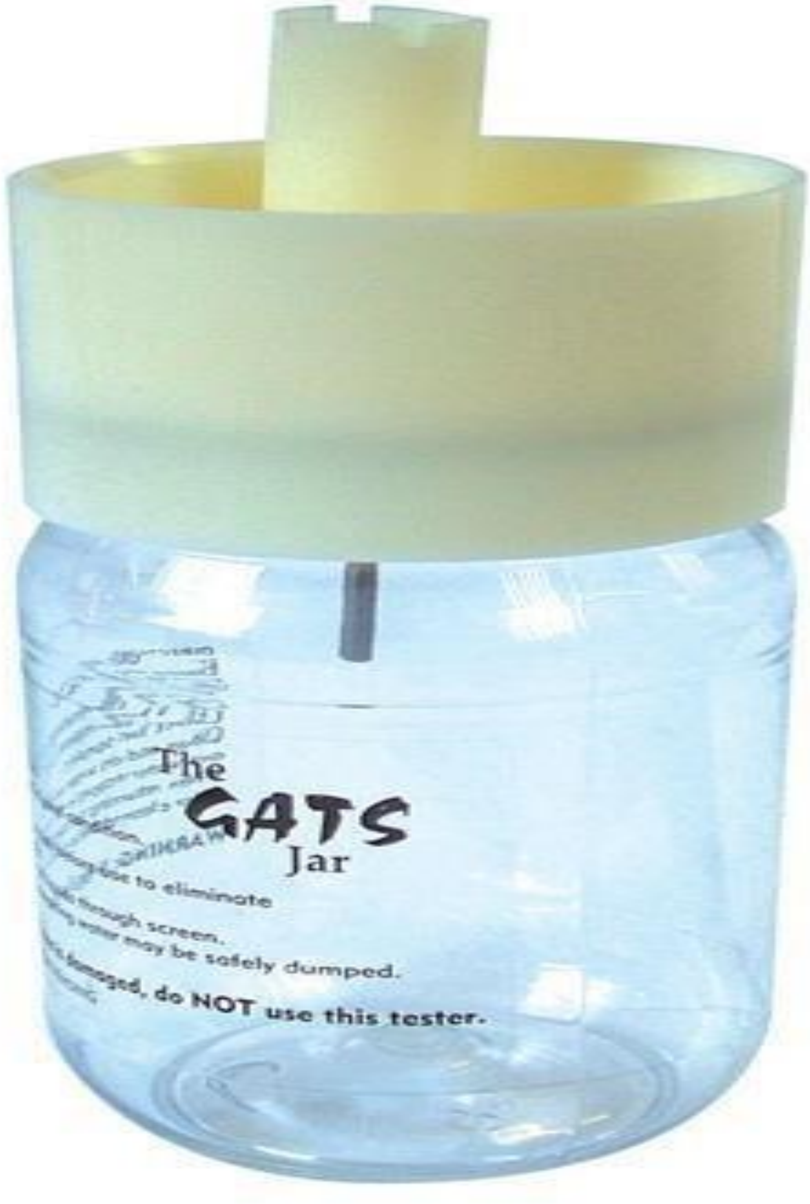
3 The GATS Jar Fuel Tester

Gasoline Analysis Test Separator (GATS).

Figure 3-1 The GATS Jar Fuel Tester



3.1 Requirements

It is a requirement that the fuel be checked for the presence of water or contaminants prior to the first flight of the day and after each refuelling (CAO 20.2 5-Fuel System Inspection).

3.2 About the GATS (Gasoline Analysis Test Separator)

The Gats Jar fuel testers are used to collect, pre-flight inspection, fuel samples. It then separates any comingled fuel and water, by allowing only the fuel to be poured back into the tank through our special built in filter, which traps the water behind. This allows the fuel samples to be returned to the aircraft instead of being thrown on the ground. After the water is trapped in the container, and the fuel is back in the tank, the captured water can then be emptied.

3.3 Storage

Each of the Australian Pilot Training Alliance Aircraft will be equipped with 1x GATS Jar. Each Gats jar will have the aircraft call sign engraved into the GATS jar and under no circumstances are the GATS jars to be removed from their designated aircraft.

After fuel testing the GATS jar is to be put back into the cabin when it is stored during flight.

3.4 How the GATS Jar Works

The separator screen on the GATS jar is made of a material that when coated with petroleum based fuels creates a barrier to the passage of water through it, but allows the flow through of fuel.

It is important to tip the tester only far enough to pour the fuel out through the screen, but not so far that the liquid level ever goes above the top of the screened opening.

To work properly the separator screen must be coated with fuel before it is exposed to water. If water should impregnate the screen it must be removed before it can be used for fuel purification. To clear the separator screen of water, Australian Pilot Training Alliance recommends using a dry absorbent tissue or cloth and wipe the top of the screen surface thoroughly. The screen mesh also provides particulate debris filtration to approximately 200 microns.

WARNING

If the separator screen is damaged, do not use the tester and seek assistance from Australian Pilot Training Alliance staff.

3.5 How to Use the GATS Jar

3.5.1 Step 1

Firstly, you must inspect the condition of the tester for damage or defect.

Ensure the following:

1. The fuel straining screen material is clean and in good condition.

2. The gats jar itself is not damaged defected, cracked or unsealed in any way.

Figure 3-2 Condition Inspection

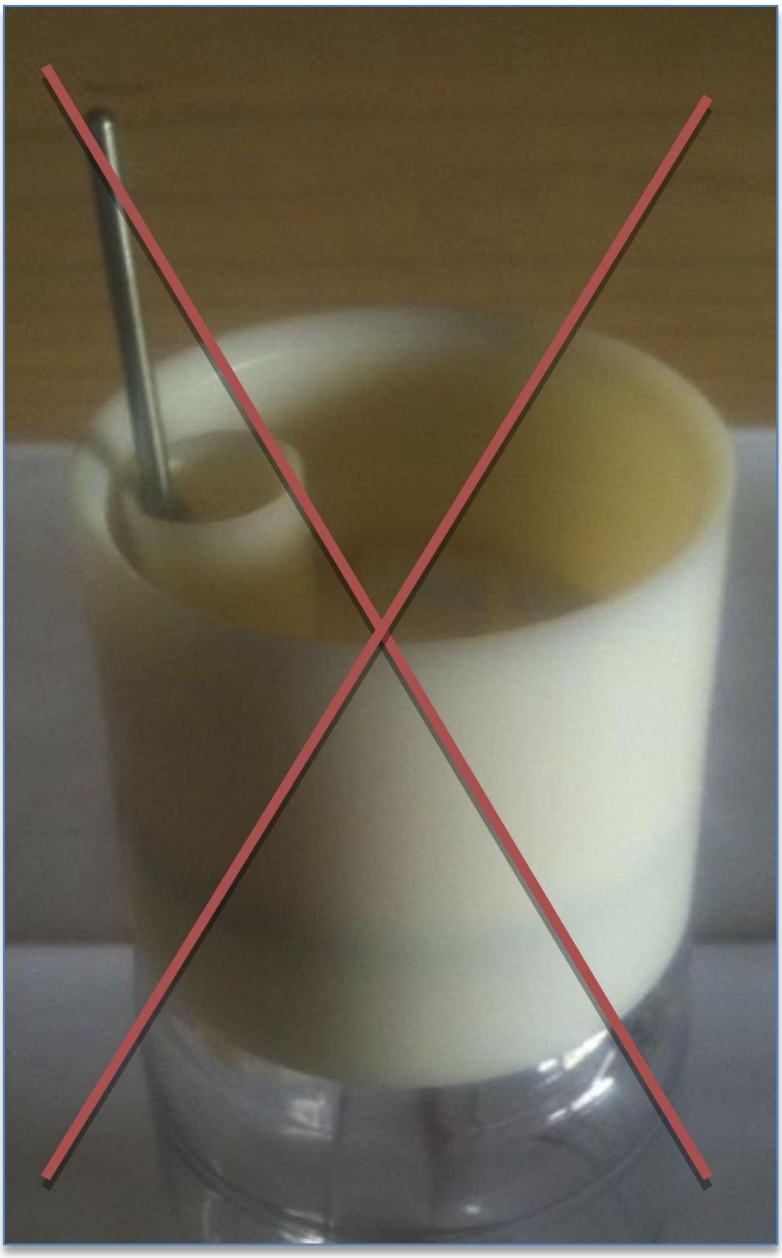
3.5.2 Step 2

Before draining fuel, you must then ensure the fuel testing port of the GATS jar is inserted correctly. The silver metal pin on the GATS jar must be facing up for fuel draining of Cessna type aircraft, and down when testing of piper type aircraft; also, when testing Cessna type aircraft the metal pin must be facing INWARD toward the centre of the fuel drain. Not outwards (see below).

Figure 3-3 Cessna Type - CORRECT

Figure 3-4 Piper Type CORRECT

Figure 3-5 Cessna Type INCORRECT



3.5.3 Step 3

Drain the fuel from your aircraft like normal. Drain approximately half an inch of fuel from one fuel drain port and inspect for contamination (see images to follow).

Complete this process for each fuel drain port on one wing, without emptying any fuel from the GATS jar, and inspecting for contamination after each fuel drain port is tested.

The GATS jar is large enough to hold fuel from all the fuel straining ports on one wing of the aircraft, without requiring emptying after each port.

Figure 3-6 Fuel Test - Drain

Figure 3-7 Fuel Test – Inspect

3.5.4 Step 4

After all the fuel drain ports have been individually inspected for contamination, hold The GATS jar up to sunlight and inspect the jar with fuel from all the drain ports one last time.

Figure 3-8 Fuel Test – Final Inspection

3.5.5 Step 5

Once all the fuel drain ports on a single side of the aircraft have been tested and inspected, open the fuel cap of the aircraft and pour the fuel back into the tanks.

IMPORTANT

It is essential for the GATS jar to work correctly that you only tip the tester so that the fuel flows out of the material screen NOT back out of where the fuel was drained from

It is also important that you only tip the tester far enough to pour the fuel out through the screen, but not so far that the liquid level ever goes above the top of the screened opening.

Figure 3-9 Correct

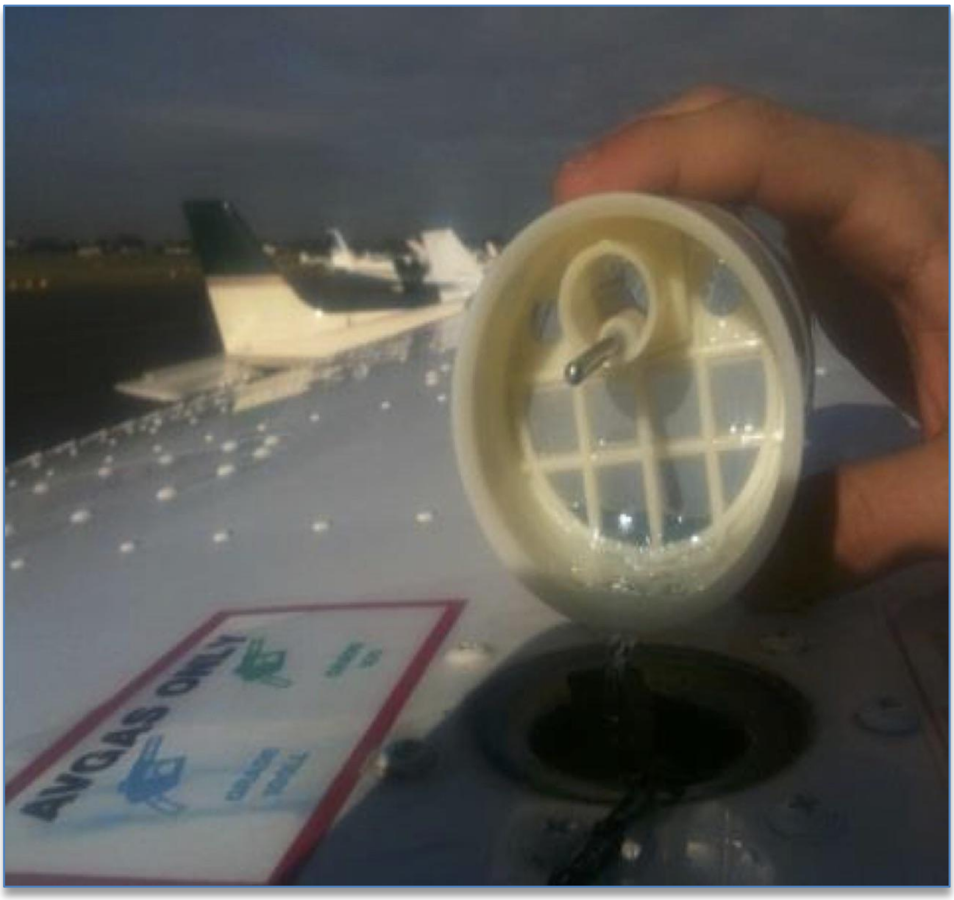


Figure 3-10 Incorrect

****This process is to be completed 3 times****

****Once for each wing's fuel drain ports and once for underneath the aircraft cowling fuel drain ports (if fitted)****

3.5.6 Step 6

Once fuel draining is complete and fuel has been poured back into the aircraft tanks, please ensure you put The GATS Jar back into the aircraft.

****Each GATS jar will have its aircraft call sign engraved into the fuel drainer and are not to be removed from that aircraft under any circumstances****

Figure 3-11 Return to Storage

****If unsure how to use the new GATS Jar fuel draining system, please seek assistance from one of our friendly Australian Pilot Training Alliance personnel****

HAPPY FUEL DRAINING!!!

4 Cessna Type Aircraft Stall Horn Tester

4.1 Stall Horn/Warning Tester

Figure 4-1 Cessna Type – A/C Stall Horn/Warning Tester

4.2 Requirement

To test stall warning prior to each flight as per manufacture's Pilot Operating Handbook (POH)

4.3 About the Stall Horn Tester

Australian Pilot Training Alliance's new Stall Horn Testers allow Pilots to quickly and easily test your aircrafts stall warning horn, without inhaling bugs or placing your mouth on the aircraft. This effective device eliminates the old way of testing the stall horn—by simply Depressing the bellow, placing the tester on the stall horn, releasing quickly and listening. You can then instantly can tell if the horn is functioning.

4.4 Storage

Each of the Australian Pilot Training Alliances Cessna Type Aircraft will be equipped with 1x Stall horn tester.

Under no circumstances are the Stall horn testers to be removed from their designated aircraft.

After Stall testing is completed, the tester is to be put back into the cabin for storage during flight.

4.4.1 Step 1

With the Stall horn tester AWAY from the aircraft, depress the bellow with your thumb. Considerable force is required.

Figure 4-2 Depress with Thumb

4.4.2 Step 2

Whilst holding the stall horn tester depressed, place the tester on the aircraft, ensuring the centre of the foam seal is on the stall vacuum opening, ensuring you apply considerable pressure on the tester to ensure adequate seal is created between the leading edge of the aircraft and the foam seal on the tester

Figure 4-3 Place Tester on the Aircraft

4.4.3 Step 3

Release the pressure from the bellow with your thumb “quickly” and listen for the stall horn.

Figure 4-4 Release Pressure Quickly/Listen for Stall Horn

4.4.4 Step 4

Once Stall Horn Testing is complete, please ensure place the tester back into the aircraft

****Each of Australian Pilot Training Alliances Cessna Type Aircraft will be equipped with a Stall Horn Tester. Under NO circumstances should the tester removed from the aircraft ****

****If unsure how to use the new Stall Horn Testing system, please seek assistance from one of our friendly Australian Pilot Training Alliance personnel****

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5 Operations in Class D Airspace

This Chapter of the training notes will identify critical information with reference to operations in and around Moorabbin Airport Class D Airspace. Discussed below, are the Minimum Visual

Meteorological Requirements for safe operation at Moorabbin Airport, the Radio Carriage

Requirements for Class D Airspace and a description of Radio Calls used at Moorabbin Airport. Discuss these areas with your Instructor to reinforce understanding of the operational requirements at Moorabbin.

5.1 Description of Moorabbin Airport

Moorabbin is a controlled Class D aerodrome. Meaning Air Traffic Control are not equipped with primary radar and rely on pilot reporting of position to make judgements and sequence traffic. Therefore it is of vital importance that a pilot operating into Moorabbin has a good level of situational awareness and good navigational skills; local knowledge will help greatly with operations as well. The airport layout can seem intimidating, however when explained and once you have familiarised yourself with operations at Moorabbin, the procedures are quite logical, straightforward and easy to understand.

Moorabbin is controlled by three controllers, a ground controller and two airborne controllers.

The Ground Controller’s primary role is to ensure that taxiing aircraft have received clearances and instructions on how to move about aerodrome. They will assist the pilot, if required on delivering detailed taxi clearances to help them navigate their way around the aerodrome. The frequency to contact ground in 119.9.

Due to the fact that there are parallel runways at Moorabbin there is a need to have two airborne controllers. The airborne controllers’ responsibilities are to facilitate arrivals and departures into and out of Moorabbin. There are recommended reporting points situated at key positions approximately in a 6nm radius around the aerodrome. This positions are the recommended points for VFR aircraft to make their inbound call and receive entry instructions. The VFR reporting points are Brighton (which is located to the North West of Moorabbin), Carrum to the south, GMH to the East and Academy to the North East.

Naturally due to the large number of movements that can occur in and around the airport two controllers are required to safely accommodate for all the arriving and departing aircraft. The

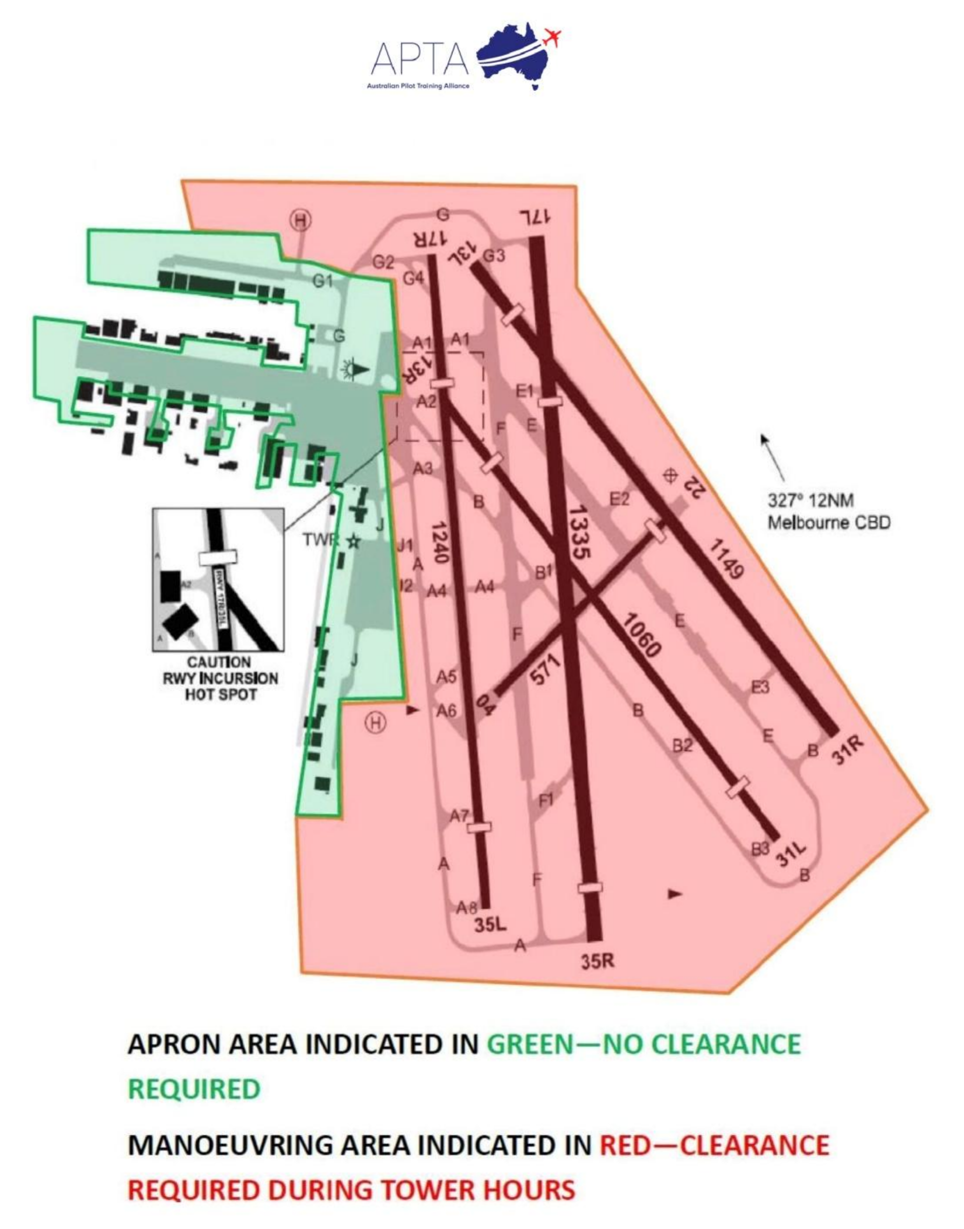
Eastern Controller is responsible the Eastern Runways, these being 17L, 35R, 13L and 31R. Most aircraft requesting to do circuits for training will be directed to these runways for their lessons. The Eastern Controller is also responsible for the inbound traffic from GMH and Academy. The Frequency to contact the Eastern Controller is on 118.1.

The Western Air Controller, manages arrivals and departures on the Western Side and is responsible for the following Runways; 17R, 35L, 13R and 31L. This controller will also manage the inbound arrivals from Brighton and Carrum. The frequency to contact the Western Controller is on 123.0.

- Refer to the airport below for a detailed view of the runway and taxiway layout.
- Discuss the layout of Moorabbin Airport further with your Instructor.

For All Operational Purposes refer to Current ERSA / Jeppessen Charts for YMMB Airport.

Figure 5-1 Moorabbin Airport (YMMB)



5.2 Minimum Visual Meteorological Requirements

MINIMUM VISUAL METEOROLOGICAL REQUIREMENTS

The Minimum Visual Meteorological Requirement or minimum VMC requirements, are the minimum deemed safe for Visual Flight Rules Operations. The Minimum VMC requirements at YMMB are as follows:

- Visibility 5000m
- Horizontal Distance from Cloud 600m
- Vertical Distance from Cloud 1000ft above, 500ft below

For Special VFR Operations, the minimum VMC requirements are as follows:

- Cloud Remain Clear of Cloud
- Visibility 1600m

5.3 ATC Aircraft Separation Responsibilities

- IFR to IFR will be separated
- IFR will receive traffic information about other VFR aircraft
- VFR aircraft will receive traffic information about other IFR and VFR aircraft.
- Special VFR will be separated from other Special VFR aircraft
- Traffic Information will be available on request to all aircraft operating in Class D airspace.
- IFR will be separated from Special VFR aircraft.

5.4 Radio Calls

Table 5-1 Moorabbin Radio Frequencies

Radio Operator	Frequency (MHz)
Moorabbin Ground	119.9
Moorabbin Tower East	118.1
Moorabbin Tower West	123.0
Moorabbin ATIS	120.9
Moorabbin ADF (ATIS also available on this frequency)	398

5.4.1 ATIS (Aerodrome Terminal Information Service)

Select 120.9 MHz on your aircraft's radio and listen carefully. You will hear the ATIS which is a repeating tape which advises important information such as the runway in use, and local weather conditions. At Moorabbin, the first ATIS for the day is designated "November", the next is "Oscar" and so on.

An Example of a Typical ATIS message is as follows:

"MOORABBIN INFORMATION PAPA, ARRIVALS AND DEPARTURES EAST, RUNWAY THREE FIVE RIGHT, FREQUENCY 118.1, ARRIVALS AND DEPARTURES WEST, RUNWAY THREE FIVE LEFT, FREQUENCY 123.0 WIND 340 DEGREES 8 KNOTS, CAVOK, QNH 1022, TEMPERATURE 13, MOORABBIN INFORMATION PAPA"

To assist with gathering information of this call, set up an ATIS Sheet to help remember the conditions and the information designator.

Table 5-2 ATIS Sheet

Item	Information		Item	Information
Information	-		Information	Papa
Runway	-		Runway	35
Wind	-		Wind	340/08
Cloud	-		5000’	
Visibility	-		Visibility	>10 km
QNH	-		QNH	1022
Temperature	-		Temperature	13

5.4.2 Start Up and Taxi Call

On the Ground at Moorabbin, when the tower is active, there is a requirement for VFR aircraft to make a start up call for circuits and possibly a taxi call for the run up bay. Once in the run up bay and pre take off procedures are complete, a radio call to MB ground requesting taxi clearance is also necessary.

During operation of tower hours, it is a requirement to maintain a continuous listening watch on the ground frequency 119.9 MHz. It is a requirement to make a radio call on 119.9 MHz once you have taxied clear of the runway after landing or when obtaining a clearance to cross an active runway.

Table 5-3 Start Up and Taxi Call(s)

Type of Call	Pilot Transmission	ATC Response	Pilot Readback
Start Up for Circuits	“Moorabbin ground, (aircraft type) [callsign] received (ATIS code), request start approval for circuits.”	“[callsign] Moorabbin ground time (minutes expressed in minutes only) start approved runway (runway designator) left/(right.)”	
Taxi Clearance at Run Up Bay	“Moorabbin ground, (Aircraft type) [callsign] received (ATIS code),(dual/solo) the Southern/(Northern) run-up bay for the training area runway (runway designator) left/(right), request taxi.”	“[callsign] Moorabbin ground, time (expressed in minutes only), taxi(taxiway designator) holding point (taxiway designator) runway (runway designator) left/(right.)”	“Taxi (taxiway designator) holding point (taxiway designator) runway (runway designator) left/(right), [callsign].”

- If you receive no acknowledgment, do not proceed – say your message again.

Try to acknowledge all instructions PROMPTLY; however if you do not understand or have not received all the information say “SAY AGAIN”. The message will be repeated.

5.4.3 Holding Point Ready Call

Select tower frequency applicable to the runway being used i.e. 118.1 MHz for eastern runway departures or 123.0 MHz for western departures. When you are ready, (Line Up Checklist Complete):

Table 5-4 Start Up and Taxi Call(s)

Type of Call	Pilot Transmission	ATC Response	Pilot Readback
Ready Call	“Moorabbin tower, [call-sign] (circuit leg for departure) for the training area (circuits) (dual/solo),ready(rwy designator) left/(right.)”	“[callsign] Moorabbin tower, hold position/(line up/cleared for takeoff.)”	Holding position/lining up/cleared for take-off), [callsign].”

You can expect several different responses from ATC. Please note the correct reply which is required:

5.4.4 Examples

Table 5-5 Moorabbin Radio Frequencies

ATC Transmission	Pilot Reply
“APTA, hold short of Runway Right”	“Hold short APTA”
“APTA, Hold Position”	“Hold position APTA”
“APTA, Line Up”	“Line up, APTA”
“APTA’ Line up, be ready for immediate departure”	“Line up, APTA”
“APTA clear for take-off”	“Clear for take-off, APTA”

Once cleared for take-off and departing for the training area:

- Depart on an extended leg of the circuit and climb to 2000 feet AMSL or higher cloud permitting.
- Comply with special departure procedures that are detailed in ERSA.
- At 6 nm Squawk code 1200 on mode c (alt.) (Please note this is APTA recommended procedure only).
- Maintain listening watch until 6 nm then contact Melbourne Centre for clearance if required or maintain listening watch on Melbourne Centre 135.7.
- Avoid departure tracks that conflict with VFR approach and reporting points.

5.4.5 Inbound Call/Clearance

Prior to reporting at recommended Inbound Point copy ATIS for Moorabbin, squawk 3000 mode Charlie on transponder.

Table 5-6 Inbound Call/Clearance Examples

Type of Call	Pilot Transmission	ATC Response	Pilot Readback
Inbound Report	"Moorabbin tower, (aircraft type) [callsign] (reporting point) (altitude) received (ATIS code) inbound (for circuits.)"	"[Call sign] Moorabbin tower, join (leg of circuit) runway (runway designator) left/(right.) report (reporting point)"	"(runway designator) left/(right.)"[callsign]
Alternative Instructions from ATC		"[callsign] Moorabbin tower, maintain 1500 over-fly the field for runway (runway designator) left/(right) contact tower (frequency) overhead."	"1500 (runway designator) left/(right). (frequency)"[CALLSIGN]
PILOT ACTION TO INSTRUCTION IS TO MAINTAIN 1500' UNTIL OVERHEAD CENTER OF AIRFIELD			
Overhead Call	"Moorabbin tower, [callsign] overhead."	"[callsign] Moorabbin tower, follow the (aircraft type) (position), **cleared visual approach** (Left/Right) downwind for runway (runway designator) left/(right.)"	"Cleared visual approach Left/Right downwind (runway designator) left/(right.)"[callsign]

You may not be given a clearance:

- If you cannot establish two-way communications with ATC, or you receive an instruction to remain clear of the control zone, do not enter the control zone until a clearance is received.
  - ATC Instruction: "[Callsign] Moorabbin Tower, remain outside control zone, call me again in 2 minutes."
  - Pilot readback: "Remaining OCTA, [callsign]"

Abbreviated Clearances:

Receipt of your call sign as an acknowledgement from the controller is a clearance to enter the control zone at circuit height, to join an approach to land on the appropriate runway and to report joining the circuit at 3 nm.

- Pilot transmission: " [callsign] joining (leg of circuit) runway (runway designator) left/(right.)"

NOTE

That this does not include a clearance to land. This must be obtained before landing.

5.5 Circuit Operations

To be made as soon as the turn onto downwind is completed (or during turn):

- "APTA, Cessna 172, downwind touch and go"

NOTE:

There is no requirement to say "Moorabbin Tower APTA....."

If you are unable to make your call due to busy radio traffic on the frequency, call as soon as possible and advise position:

- "APTA, Cessna 172, Mid –Downwind (or Late-Downwind) Touch and Go" If you intend to make a full stop landing the call is:
- " APTA, Cessna 172, Downwind Full Stop" ATC Response to a "Downwind Call"

Table 5-7 Circuit Operations

ATC Transmission	Pilot Reply
"APTA, follow the Cessna late downwind"	"APTA"
"APTA, your number 2 follow the Arrow joining base"	"APTA"
"APTA"	(no reply to be made. Instructions will be given shortly)
"APTA clear Touch and Go"	"Clear Touch and Go APTA"

NOTE:

When asked to follow traffic give your callsign straight away. Don't wait and look for the traffic before replying as this will block the frequency. Other pilots will be waiting for you to reply before they can give their own radio calls.

If you cannot see the aircraft which you have been assigned to follow, have a good look and if the traffic is still not sighted then call:

- "APTA, traffic not sighted"

ATC will then give you further instructions on the aircraft's position.

5.5.1 Obtaining Taxi Clearance

Once landed and Clear of Runway, STOP, execute after landing checks, look up and search for the tower to assist with self orientation. Look at the Airport Diagram and identify position, and then change frequency to Moorabbin Ground to obtain a taxi clearance.

Table 5-8 Inbound Call/Clearance Examples

Type of Call	Pilot Transmission	ATC Response	Pilot Readback
Inbound Report	"Moorabbin ground, [callsign] on taxiway (taxiway designator) for APTA Apron request taxi."	"[callsign] Moorabbin ground, taxi(taxiway designator) to holding point (taxiway designator) runway (runway designator) left/(right.)"	"Taxi (taxiway designator) holding point (taxiway designator) runway (runway designator) left/(right), [callsign]."
If no Taxi Limit is imposed by ATC		"[callsign] Moorabbin ground, taxi to Apron on taxiway (taxiway designator) cross runway (runway designator) left/(right.)"	"Taxiing (taxiway designator) crossing runway (runway designator) left/(right), [callsign]."

COMMON SENSE SHOULD PREVAIL DURING TAXI; if you have been cleared to taxi and the pilot observes a collision; do not proceed with taxi until collision risk is clear. Another Clearance may be required however.

5.5.2 Radio Failure Procedure

In the event of a radio failure, select transponder code 7600, transmit intentions at all times prefixed "transmitting blind". ATC may be able to hear you even if you cannot hear them. Listen out for instructions from the tower on ADF frequency 398 KHZ. Overfly the field at 1500 feet – observe the traffic pattern and descend to circuit altitude via crosswind entry point to join the circuit on the western side of the field. Make a normal approach observing the Tower for light signals.

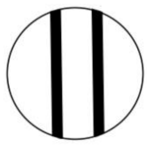
REMEMBER:

- Always listen out before transmitting to allow others to make their acknowledgments.
- Always acknowledge instructions from the tower crisply and PROMPTLY.
- Always decide what you are going to say before you press the transmit button and release the button immediately after you finish your message.
- You will hear various other calls used by aircraft, but check with your Instructor before using them, as they are possibly incorrect.

- If the tower speaks either too quickly or softly, you have the right to say “SAY AGAIN”. If you make a mistake simply say “CORRECTION....” and proceed with your correct message.

Moorabbin Tower can communicate to you through the use of light signals on final and on the ground during taxi.

Table 5-9 Tower Light Signals – On Ground/In-Flight

Description	Signal
Steady Green – Authorised to Take-off, Authorised to Land	
Flashing Green – authorized to Taxi, Return to Land	
Steady Red – STOP DO NOT LAND, Continue Circling	
Flashing Red – Taxi clear of Landing, DO NOT LAND	
Flashing White – Return to Original Not Applicable, Starting Point Ground Signal Only	

6 Taxiing

6.1 Objective

To control speed and direction on ground, through the correct coordination of rudder nose wheel steering and power.

6.2 Air Exercise

6.2.1 Rules of Taxiing

- When two aircraft meet head on – EACH TURNS' TO THE RIGHT
- When one aircraft is overtaking another - THE OVERTAKING AIRCRAFT MUST GIVE WAY
- Aircraft landing and taking off have right of way over taxiing aircraft
- The pilot should be conversant with the use of standard hand signals as per CAO 20.3, Appendix 1

6.2.2 Practice

- Carry out pre-taxi checks as specified in the aircraft handling notes
- Check all clear - do not attempt to taxi in a restricted space without outside assistance
- Open throttle sufficient to get aircraft moving - close throttle and TEST BRAKES (see SOPs)
- Taxi slowly and ensure forward area is clear before passing

Intentionally Blank

7 Checklists

7.1 Objective

To appropriately apply the checklist as required throughout the entire operation of any flight exercise whilst recognising the relevant application of each items' importance toward the successful and safe operation of the aircraft.

7.2 Considerations

7.2.1 Execution of Checks and Actions

- A check or action is considered not done unless called out aloud and confirmed with touch.
- An instrument, gauge or ancillary control is considered not checked unless visually identified.

NOTE:

If there is no RPM drop when checking one or both magnetos, check for a "dead cut" by switching briefly to "off" then to "both" again. Should the engine continue to run with the magnetos switched to the "off" position during this check, the engine should be shutdown and after alighting from the aircraft, you should,

- Display a warning device on the propeller e.g. a red flag or danger sign Report the aircraft unserviceable.

An example of Pre Manoeuvre Checklist for stalling – HASELL

H Hatches and Harnesses secure

Height sufficient to recover by 3000ft AGL

A Airframe configured

S Security (loose articles)

E Engine indications correct

Fuel pump on (if appropriate to a/c type), Mixture RICH

L Locality suitable (area suitable to conduct a forced landing)

Loose articles secured

L LOOKOUT – 360 degree turn completed

7.2.2 Checklist Philosophy

Checklists should be committed to memory as soon as possible. They use what is called a “flow” that allows you to remember the pattern as you check the required items. After a checklist is completed, all items coloured magenta are “essential items” and require a read back on each item to ensure it has been checked.

Refer to APTA Operations Manual – Current Checklist, Philosophy and Use of Checklists.

Figure 7-1 Sample C152 Checklist

C152 CHECKLIST
FORM 2-002 (20OCT17)

PRE-START
DOCUMENTATION........ S/OUT COMPL/DISP
TRIP SHEET........ LOGGED
MR........ SIGNED
PAX BRIEFING........ COMPLETE
AIRCRAFT........ SECURE
SEATS........ SET/LOCKED
SEATBELTS........ FASTENED
PARK BRAKE........ SET
FUEL SELECTOR........ ON
MIXTURE........ RICH
THROTTLE........ SET ½ "
CARBURETTOR HEAT........ OFF
BEACON........ ON
CIRCUIT BREAKERS........ IN
AVIONICS........ OFF
MASTER........ ON
PRIME AS REQUIRED
ALL CLEAR........ CHECK / START

AFTER START
THROTTLE........ 1000RPM
OIL PRESSURE........ GREEN (30 SECS)
SUCTION........ 4.8 – 5.2" HG
ALTERNATOR........ CHARGING
AVIONICS........ ON

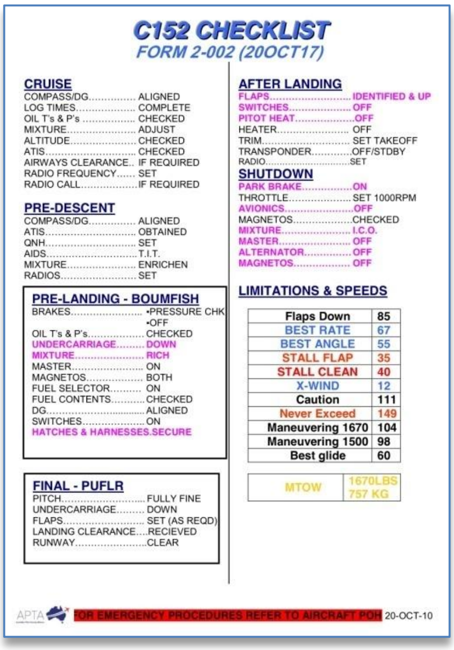
TAXI
BRAKES........ CHECKED
LEFT TURN........ •RIGHT SKID
•T&B LEFT
•COMPASS ↓
•DG ↓
•AH ERECT
•ADF TRACKING
RIGHT TURN........ •LEFT SKID
•T&B RIGHT
•COMPASS ↑
•DG ↑
•AH ERECT
•ADF TRACKING

PRE-TAKE OFF - TMPFISCH
PARK BRAKE........ ON
THROTTLE FRICTION........ SET
TRIMS........ SET
MIXTURE........ RICH
MASTER........ ON
MAGNETOS........ BOTH
PRIMER........ IN/LOCKED
FLAPS........ CHECKED/SET
FUEL SELECTOR........ ON
FUEL CONTENTS........ CHECKED
FLIGHT INSTRUMENTS........ CHECKED/SET
NAV AIDS........ TUNE,IDENT,TEST
RADIOS........ SET
THROTTLE........ 1700RPM
OIL T & P/ AMPS/ SUC........ CHECKED
CARBURETTOR HEAT........ CHECK
MAGNETOS........ CHECK (<125RPM)
THROTTLE TO IDLE........ 600-800RPM
CONTROLS........ •CORRECT
•FULL& FREE
HATCHES & HARNESSES.SECURE
T.O.S.B........ COMPLETED

LINE UP - FEMS
FUEL SELECTOR........ ON
ENGINE INSTRUMENTS........ CHECKED
MIXTURE........ RICH
MASTER........ ON
MAGNETOS........ BOTH
RADIO........ SET
TRANSPONDER........ ALT
SWITCHES........ ON
PITOT HEAT........ AS REQ
DG........ ALIGNED

CLIMB
FLAPS........ UP
OIL T's & P's........ CHECKED

APTA FOR EMERGENCY PROCEDURES REFER TO AIRCRAFT POH 20-OCT-10



C152 CHECKLIST
FORM 2-002 (20OCT17)

CRUISE
COMPASS/DG........ ALIGNED
LOG TIMES........ COMPLETE
OIL T's & P's........ CHECKED
MIXTURE........ ADJUST
ALTITUDE........ CHECKED
ATIS........ CHECKED
AIRWAYS CLEARANCE........ IF REQUIRED
RADIO FREQUENCY........ SET
RADIO CALL........ IF REQUIRED

PRE-DESCENT
COMPASS/DG........ ALIGNED
ATIS........ OBTAINED
QNH........ SET
AIDS........ T.I.T.
MIXTURE........ ENRICHEN
RADIOS........ SET

PRE-LANDING - BOUMFISH
BRAKES........ •PRESSURE CHK
•OFF
OIL T's & P's........ CHECKED
UNDERCARRIAGE........ DOWN
MIXTURE........ RICH
MASTER........ ON
MAGNETOS........ BOTH
FUEL SELECTOR........ ON
FUEL CONTENTS........ CHECKED
DG........ ALIGNED
SWITCHES........ ON
HATCHES & HARNESSES.SECURE

FINAL - PUFLR
PITCH........ FULLY FINE
UNDERCARRIAGE........ DOWN
FLAPS........ SET (AS REQD)
LANDING CLEARANCE........ RECIEVED
RUNWAY........ CLEAR

AFTER LANDING
FLAPS........ IDENTIFIED & UP
SWITCHES........ OFF
PITOT HEAT........ OFF
HEATER........ OFF
TRIM........ SET TAKEOFF
TRANSPONDER........ OFF/STDBY
RADIO........ SET

SHUTDOWN
PARK BRAKE........ ON
THROTTLE........ SET 1000RPM
AVIONICS........ OFF
MAGNETOS........ CHECKED
MIXTURE........ I.C.O.
MASTER........ OFF
ALTERNATOR........ OFF
MAGNETOS........ OFF

LIMITATIONS & SPEEDS

Flaps Down	85
BEST RATE	67
BEST ANGLE	55
STALL FLAP	35
STALL CLEAN	40
X-WIND	12
Caution	111
Never Exceed	149
Maneuvering 1670	104
Maneuvering 1500	98
Best glide	60

MTOW	1670LBS 757 KG

APTA FOR EMERGENCY PROCEDURES REFER TO AIRCRAFT POH 20-OCT-10

Figure 7-2 Sample C172 Checklist

C172M SKYHAWK CHECKLIST
FORM 2-003 (20OCT17)

PRE-START
DOCUMENTATION......... S/OUT COMPL/DISP
TRIP SHEET .... COMPLETE
MR.............................. SIGNED
PAX BRIEFING............... COMPLETE
AIRCRAFT..................... SECURE
SEATS.......................... SET/LOCKED
SEATBELTS.................. FASTENED
PARK BRAKE................ SET
FUEL SELECTOR........... BOTH
MIXTURE..................... RICH
THROTTLE.................... SET ¼ "
CARBURETTOR HEAT.... OFF
BEACON....................... ON
CIRCUIT BREAKERS...... IN
AVIONICS..................... OFF
MASTER....................... ON
PRIME AS REQUIRED
ALL CLEAR.................... CHECK / START

AFTER START - TOSA
THROTTLE.................... 1000RPM
OIL PRESSURE............. GREEN (30 SECS)
SUCTION...................... 4.8 – 5.2" HG
ALTERNATOR............... CHARGING
AVIONICS..................... ON

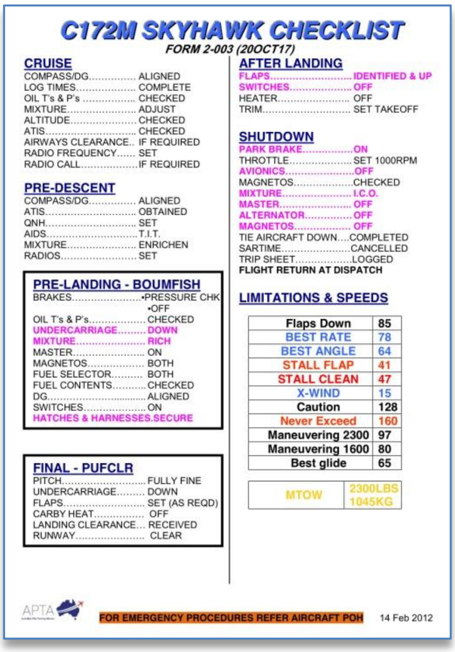
TAXI
BRAKES......................... CHECKED
LEFT TURN..................... •RIGHT SKID
•T&B LEFT
•COMPASS ↓
•DG ↓
•AH ERECT
•ADF TRACKING
RIGHT TURN.................. •LEFT SKID
•T&B RIGHT
•COMPASS ↑
•DG ↑
•AH ERECT
•ADF TRACKING

PRE-TAKE OFF - TMPFISCH
PARK BRAKE................. ON
THROTTLE FRICTION...... SET
TRIMS........................... SET
MIXTURE....................... RICH
MASTER........................ ON
MAGNETOS................... BOTH
PRIMER......................... IN/LOCKED
FLAPS........................... CHECKED/SET
FUEL SELECTOR........... BOTH
FUEL CONTENTS........... CHECKED
FLIGHT INSTRUMENTS... CHECKED/SET
NAV AIDS...................... TUNE,IDENT,TEST
RADIOS......................... SET
THROTTLE..................... 1700RPM
OIL T & P/ AMPS/ SUC..... CHECKED
CARBURETTOR HEAT.... CHECK
MAGNETOS.................... CHECK (<125RPM)
THROTTLE TO IDLE....... 600-800RPM
CONTROLS.................... •CORRECT
•FULL& FREE
HATCHES & HARNESSES.SECURE
T.O.S.B......... .... COMPLETED

LINE UP - FEMS
FUEL SELECTOR........... BOTH
ENGINE INSTRUMENTS.. CHECKED
MIXTURE........................ RICH
MASTER......................... ON
MAGNETOS.................... BOTH
RADIO........................... SET
SWITCHES...................... ON
DG................................ ALIGNED

CLIMB
FLAPS........................... UP
OIL T's & P's.................. CHECKED

FOR EMERGENCY PROCEDURES REFER AIRCRAFT POH
14 Feb 2012



C172M SKYHAWK CHECKLIST
FORM 2-003 (20OCT17)

CRUISE
COMPASS/DG............... ALIGNED
LOG TIMES.................... COMPLETE
OIL T's & P's .... CHECKED
MIXTURE....................... ADJUST
ALTITUDE..................... CHECKED
ATIS............................. CHECKED
AIRWAYS CLEARANCE.. IF REQUIRED
RADIO FREQUENCY...... SET
RADIO CALL.................. IF REQUIRED

PRE-DESCENT
COMPASS/DG............... ALIGNED
ATIS............................. OBTAINED
QNH............................. SET
AIDS............................. T.I.T.
MIXTURE....................... ENRICHEN
RADIOS......................... SET

PRE-LANDING - BOUMFISH
BRAKES........................ •PRESSURE CHK
•OFF
OIL T's & P's.................. CHECKED
UNDERCARRIAGE......... DOWN
MIXTURE....................... RICH
MASTER........................ ON
MAGNETOS................... BOTH
FUEL SELECTOR.......... BOTH
FUEL CONTENTS........... CHECKED
DG................................ ALIGNED
SWITCHES.................... ON
HATCHES & HARNESSES.SECURE

FINAL - PUFCLR
PITCH............................ FULLY FINE
UNDERCARRIAGE......... DOWN
FLAPS........................... SET (AS REQD)
CARBY HEAT................ OFF
LANDING CLEARANCE... RECEIVED
RUNWAY....................... CLEAR

AFTER LANDING
FLAPS........................... IDENTIFIED & UP
SWITCHES.................... OFF
HEATER........................ OFF
TRIM............................ SET TAKEOFF

SHUTDOWN
PARK BRAKE................ ON
THROTTLE.................... SET 1000RPM
AVIONICS..................... OFF
MAGNETOS................... CHECKED
MIXTURE...................... I.C.O.
MASTER........................ OFF
ALTERNATOR............... OFF
MAGNETOS.................. OFF
TIE AIRCRAFT DOWN.... COMPLETED
SARTIME....................... CANCELLED
TRIP SHEET.................. LOGGED
FLIGHT RETURN AT DISPATCH

LIMITATIONS & SPEEDS

Flaps Down	85
BEST RATE	78
BEST ANGLE	64
STALL FLAP	41
STALL CLEAN	47
X-WIND	15
Caution	128
Never Exceed	160
Maneuvering 2300	97
Maneuvering 1600	80
Best glide	65

MTOW	2300LBS 1045KG

FOR EMERGENCY PROCEDURES REFER AIRCRAFT POH
14 Feb 2012

Figure 7-3 Sample PA-28-161 Warrior II Checklist

PA-28-161 WARRIOR III CHECKLIST
FORM 2-037 (20OCT17)

PRE-START
PAX BRIEFING............... COMPLETE
DOCUMENTATION......... COMPLETE
AIRCRAFT..................... SECURE
SEATS.......................... ADJUSTED/LOCKED
SEATBELTS.................. FASTENED
PARK BRAKE................ SET
CIRCUIT BREAKERS...... IN
AVIONICS..................... OFF
FUEL SELECTOR........... LEFT/LEAST
MIXTURE..................... RICH
THROTTLE.................... SET ¼ "
CARBURETOR HEAT...... OFF
MASTER....................... ON
BEACON....................... ON
FUEL PUMP.................. ON
FUEL PRESSURE.......... CHECKED
PRIME.......................... AS REQUIRED
ALL CLEAR.................... CHECK / START

AFTER START
THROTTLE.................... 1000RPM
OIL PRESSURE............. GREEN (30 SECS)
SUCTION...................... 4.8 – 5.2" HG
ALTERNATOR............... CHARGING
FUEL PUMP.................. OFF
MIXTURE...................... SET
AVIONICS..................... ON
VERIFY VAC.................. OFF
AUX VAC PUMP............. ON
LIGHT............. ON
ELEC LOAD..... 11-15AMPS ↑
AUX VAC PUMP............. OFF
LIGHT............. OFF

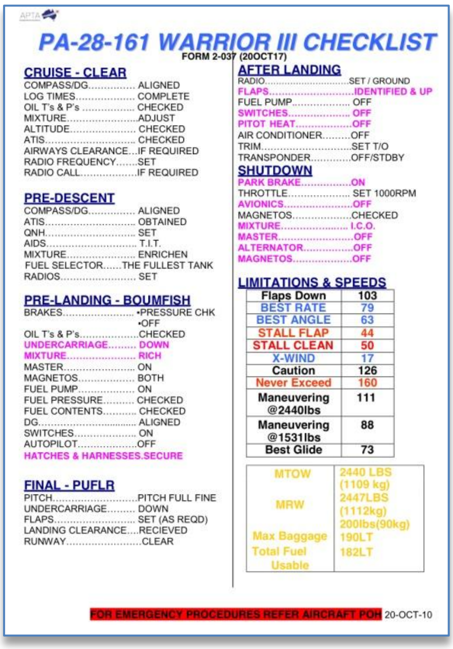
TAXI
BRAKES......................... CHECKED
LEFT TURN..................... •RIGHT SKID
•T&B LEFT
•COMPASS ↓
•DG ↓
•AH ERECT
•ADF TRACKING
RIGHT TURN.................. •LEFT SKID
•T&B RIGHT
•COMPASS ↑
•DG ↑
•AH ERECT
•ADF TRACKING

PRE-TAKE OFF - TMPFISCH
PARK BRAKE................. ON
THROTTLE FRICTION...... SET
TRIMS........................... SET
MIXTURE....................... RICH
MASTER........................ ON
MAGNETOS................... BOTH
PRIMER......................... IN/LOCKED
FLAPS........................... CHECKED/SET
FUEL PUMP................... OFF
FUEL SELECTOR........... RIGHT/FULLEST
FUEL PRESSURE........... CHECKED
FUEL CONTENTS........... CHECKED
FLIGHT INSTRUMENTS... CHECKED/SET
NAV AIDS...................... TUNE,IDENT,TEST
RADIOS......................... SET
AUTOPILOT................... TESTED
HEADING BUG............... SET
THROTTLE..................... 2000RPM
OIL T & P/ AMPS/ SUC..... CHECKED
CARBURETTOR HEAT.... CHECK
MAGNETOS.................... CHECK (<175RPM)
ANNUNCIATOR LIGHTS... CHECKED
THROTTLE TO IDLE...... 600-800RPM
CONTROLS.................... •CORRECT
•FULL& FREE
HATCHES & HARNESSES.SECURE
AIR CONDITIONER.......... OFF
T.O.S.B......... .... COMPLETED

LINE UP - FEMS
FUEL PUMP.................. ON
FUEL PRESSURE........... CHECKED
MIXTURE.......... .... RICH
MASTER........................ ON
MAGNETOS................... BOTH
RADIO........................... SET
TRANSPONDER............. ALT
SWITCHES..................... ON
PITOT HEAT.................. AS REQ
DG................................ ALIGNED

CLIMB
FLAPS........................... UP
OIL T's & P's.................. CHECKED
FUEL PUMP................... OFF
FUEL PRESSURE.......... CHECKED

FOR EMERGENCY PROCEDURES REFER AIRCRAFT POH
20-OCT-10



PA-28-161 WARRIOR III CHECKLIST
FORM 2-037 (20OCT17)

CRUISE - CLEAR
COMPASS/DG............... ALIGNED
LOG TIMES.................... COMPLETE
OIL T's & P's .... CHECKED
MIXTURE....................... ADJUST
ALTITUDE..................... CHECKED
ATIS............................. CHECKED
AIRWAYS CLEARANCE... IF REQUIRED
RADIO FREQUENCY....... SET
RADIO CALL.................. IF REQUIRED

PRE-DESCENT
COMPASS/DG............... ALIGNED
ATIS............................. OBTAINED
QNH............................. SET
AIDS............................. T.I.T.
MIXTURE....................... ENRICHEN
FUEL SELECTOR...... THE FULLEST TANK
RADIOS......................... SET

PRE-LANDING - BOUMFISH
BRAKES........................ •PRESSURE CHK
•OFF
OIL T's & P's.................. CHECKED
UNDERCARRIAGE......... DOWN
MIXTURE....................... RICH
MASTER........................ ON
MAGNETOS................... BOTH
FUEL PUMP................... ON
FUEL PRESSURE.......... CHECKED
FUEL CONTENTS........... CHECKED
DG................................ ALIGNED
SWITCHES.................... ON
AUTOPILOT................... OFF
HATCHES & HARNESSES.SECURE

FINAL - PUFLR
PITCH............................ PITCH FULL FINE
UNDERCARRIAGE......... DOWN
FLAPS........................... SET (AS REQD)
LANDING CLEARANCE.... RECIEVED
RUNWAY....................... CLEAR

AFTER LANDING
RADIO............................ SET / GROUND
FLAPS........................... IDENTIFIED & UP
FUEL PUMP................... OFF
SWITCHES.................... OFF
PITOT HEAT.................. OFF
AIR CONDITIONER......... OFF
TRIM............................ SET T/O
TRANSPONDER............. OFF/STDBY

SHUTDOWN
PARK BRAKE................ ON
THROTTLE.................... SET 1000RPM
AVIONICS..................... OFF
MAGNETOS................... CHECKED
MIXTURE...................... I.C.O.
MASTER........................ OFF
ALTERNATOR............... OFF
MAGNETOS.................. OFF

LIMITATIONS & SPEEDS

Flaps Down	103
BEST RATE	79
BEST ANGLE	63
STALL FLAP	44
STALL CLEAN	50
X-WIND	17
Caution	126
Never Exceed	160
Maneuvering @2440lbs	111
Maneuvering @1531lbs	88
Best Glide	73

MTOW	2440 LBS (1109 kg)
MRW	2447LBS (1112kg)
Max Baggage	200lbs(90kg)
Total Fuel Usable	190LT 182LT

FOR EMERGENCY PROCEDURES REFER AIRCRAFT POH
20-OCT-10

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8 Effects of Controls

Figure 8-1 Effects of Controls

8.1 Aim

To accurately manipulate the primary controls to desired aircraft attitudes and understand how the ancillary controls are used to assist handling.

8.2 Objectives

- Recognise variations in Pitch, Roll and Yaw attitudes.
- Apply the use of elevator, aileron and rudder to desired aircraft attitudes.
- Recognise and predict the secondary effects of each primary control.
- Recognise the effect of Airspeed on Control Effectiveness.
- Understand the effect of power and slipstream on aircraft pitch, balance and control effectiveness.
- Counter the initial effects of flap and recognise the change in attitude and airspeed when extended.
- Apply the use of trim to relieve control column loads.
- Identify the position of the Throttle, Mixture and Carburettor Heat in the cockpit and understand their application.
- Consider the potential threats and errors of the exercise and manage these appropriately

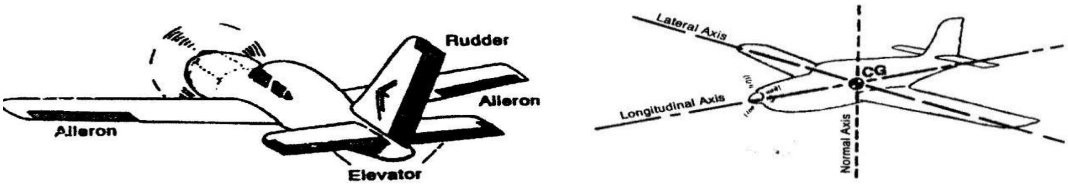
8.3 Application

All facets of flight.

8.4 Air Exercise

- The use of the primary controls to manipulate aircraft attitude.

Figure 8-2 Use of Primary Controls



- Recognise and Predict the Secondary effects of the Primary Controls.

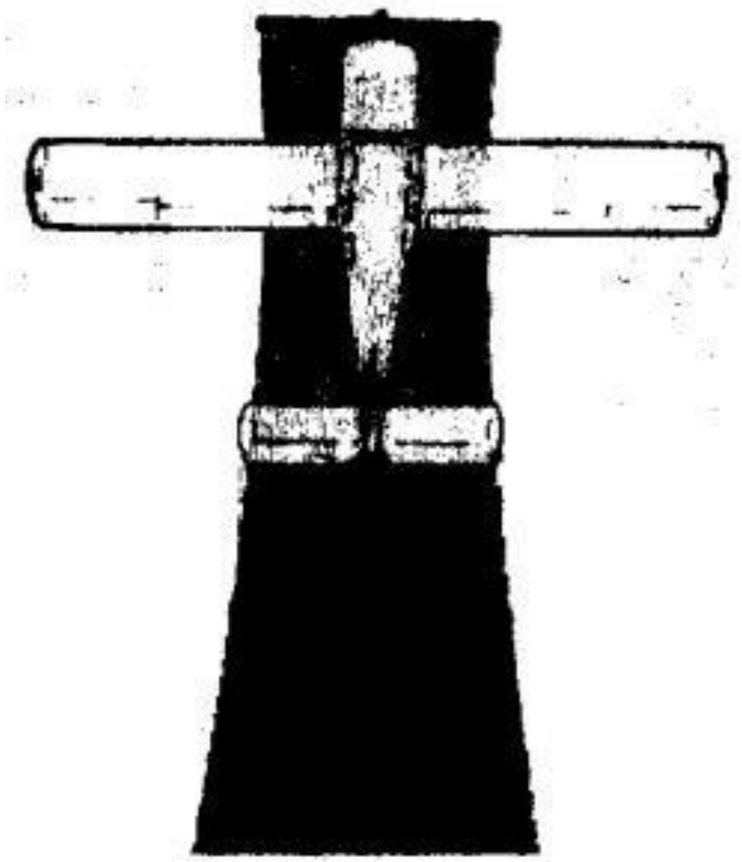
Table 8-1 Effects of Controls

Control Surface	Primary	Secondary Effect	Axis
Aileron	Roll	Yaw	Longitudinal
Elevator	Pitch	ASI, ALT	Lateral
Rudder	Yaw	Roll	Normal

8.5 Effect of Airspeed

- High speed; control effectiveness increases due to increased airflow over the surfaces.
- Low speed; control effectiveness decreases and will have a sloppy feel. Greater control input is required.

Figure 8-3 Effect of Power



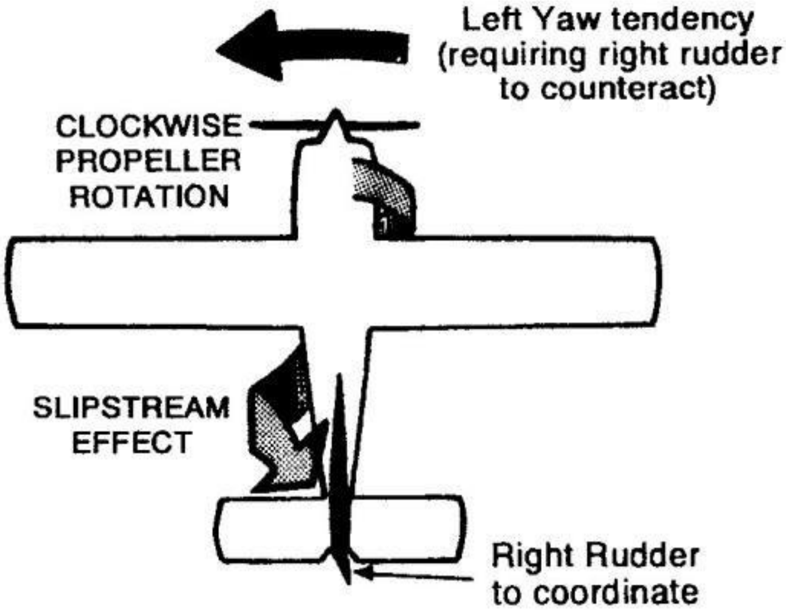
8.6 Effect of Power

An increase or decrease in power will cause the nose to pitch up or pitch down respectively. This is due to the down force on the elevator resulting from the change in the amount of propeller wash.

8.7 Effect of Slipstream

- An increase in power will increase the spiral airflow around the fuselage striking the left side of the rudder. Causing Yaw.

Figure 8-4 Effect of Slipstream



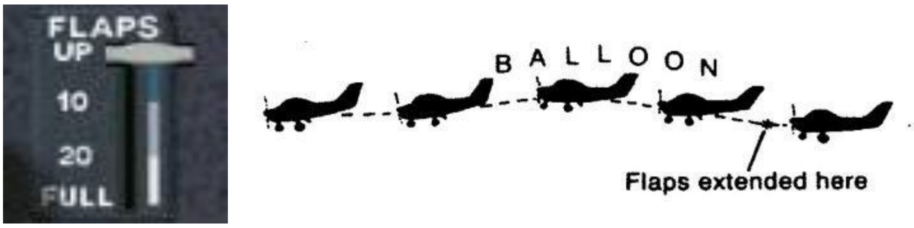
- Balance this yawing tendency with right rudder to maintain direction.
- Control effectiveness on the rudder and elevator will be increased with an increase in power.

8.8 Ancillary Controls

8.8.1 Flap

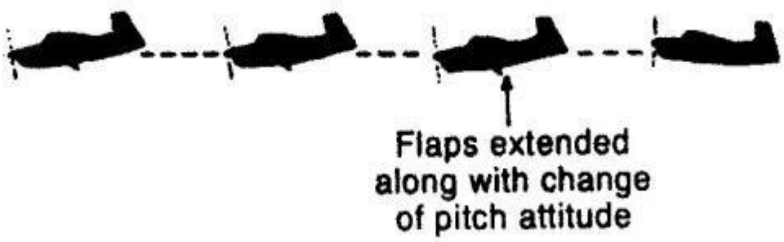
Lowering flap will increase the camber and therefore the lift. The increased lift will cause the nose to pitch up and the aircraft to balloon.

Figure 8-5 Flaps/Ballooning



To prevent Ballooning, forward pressure should be applied progressively as flap is lowered.

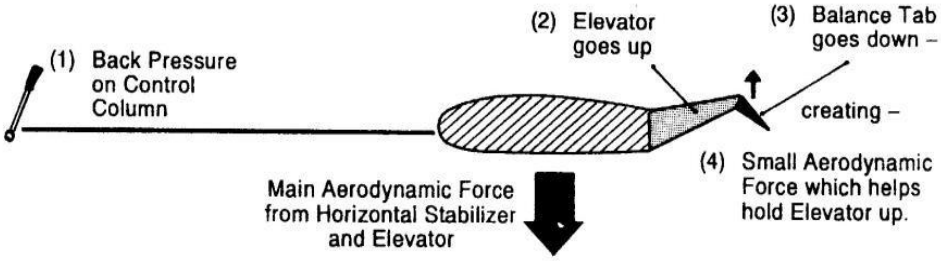
Figure 8-6 Prevent Ballooning



8.8.2 Trim

- Trim relieves control loads.

Figure 8-7 Trim



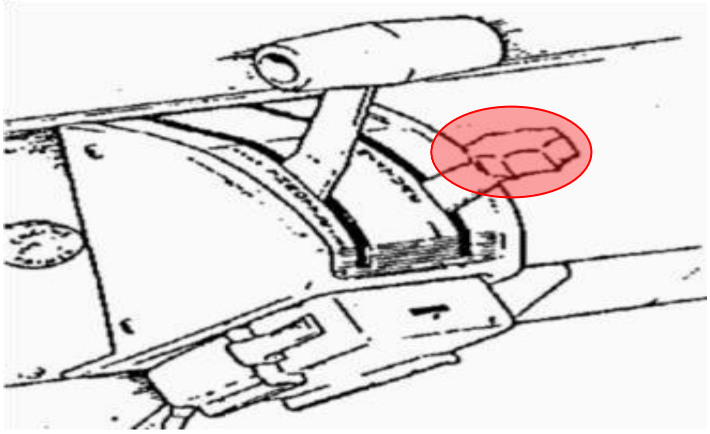
- Correct Use: Hold attitude; if forward pressure is felt, roll trim forwards until all pressure is relieved, conversely, if back pressure is required roll trim back until pressure is relieved.

8.9 Mixture

- Mixture: Adjusts the fuel/air ratio to obtain the correct mixture at various settings. Idle cut off (lever fully out) shuts down the engine.

Figure 8-8 Mixture – C152 & C172

Figure 8-9 Mixture – PA-28

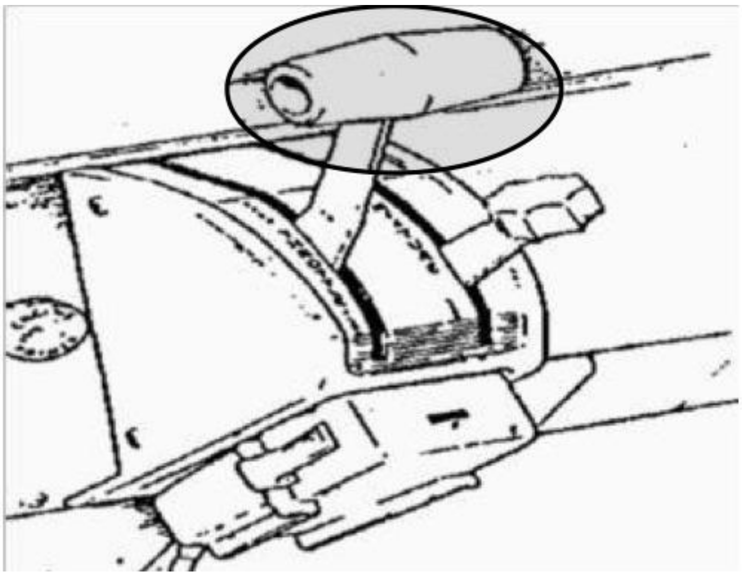


8.10 Throttle

- Throttle: Advance forward to increase power. Retard to reduce power.

Figure 8-10 Throttle – C152 & C172

Figure 8-11 Throttle – PA-28



- Applicable for the C152 & PA-28, Carby heat:
  - Used to prevent or remove carburettor ice
  - If ice should occur turn carby heat to the “on” position
  - When RPM is reduced below 2000RPM put carby heat on to prevent ice forming.

Table 8-2 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Through Daily Inspection Maintenance Release
Pilot Flying	I have control/You have control Procedure
Traffic	Vigilant Lookout (A.L.A.P.)

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9 Straight and Level

9.1 Aim

To fly the aircraft straight; on a nominated heading, and level; on a nominated altitude, through varying configurations of power and attitude all whilst in balance.

9.2 Objectives

- Recognise and maintain Normal Cruise Speed Attitude
- Manipulate Power and Attitude to achieve desired cruise speed configurations.
- All whilst maintaining Straight: Constant Heading +/- 5°
  Balance ¼ Ball
  And Level: Constant Altitude +/- 150 feet

and

- Accurately trim the aircraft once stabilised in the desired cruise configuration.
- Consider the potential threats and errors of the exercise and manage these appropriately

9.3 Application

- The Normal Cruise is the most common attitude used to enter from and exit onto when conducting manoeuvres such as turning, climbing and descending etc.
- Shortest distance between two points for:
  - Circuit Area on Downwind
  - Transiting to and from the training area
  - Enroute Cruise in Navigation

9.4 Revision

POWER + ALTITUDE = PERFORMANCE

Table 9-1 Cruise Schedule Configuration – C152

Cruise	Cessna 152
	Power (RPM)
Slow	55% (Refer to AFM)

Cruise	Cessna 152
	Power (RPM)
Normal	65% (Refer to AFM)
Fast	75% (Refer to AFM)

Table 9-2 Cruise Schedule Configuration – C172R

Cruise	Cessna 172R
	Power (RPM)
Slow	55% (Refer to AFM)
Normal	65% (Refer to AFM)
Fast	75% (Refer to AFM)

Table 9-3 Cruise Schedule Configuration – PA-28

Cruise	PA-28 Warrior
	Power (RPM)
Slow	55% (Refer to AFM)
Normal	65% (Refer to AFM)
Fast	75% (Refer to AFM)

9.5 Air Exercise

Demonstration and Direction of Straight and Level Normal Cruise Flight whilst applying appropriate corrections in Roll, Pitch and Yaw to maintain correct attitude.

Figure 9-1 Air Exercise

9.5.1 Procedure for Reducing Airspeed – from Normal Cruise to Slow Cruise

Pre Manoeuvre:

1. Select: Reference point
   Reference heading
   Reference Altitude
2. Confirm Safe by Lookout
3. Commence Manoeuvre:
   - (P)ower- Reduce to _________, maintain balance
   - (A)ttitude- roughly 2 fingers on top of the dash board to horizon
   - (S)peed will approximately be 80kts and must have (S)tabilised
   - (T)rim to relieve control column pressure to assist in maintaining straight and level attitude

Once established in the Cruise it is necessary to apply a systematic scan to ensure all tolerances and handling requirements are managed and that the safety of the manoeuvre is not compromised.

4. Monitoring Scan: -
   - (A)ttitude- maintain correct attitude observe dash to horizon and correct if necessary.
   - (L)ookout-In all directions to confirm cleared airspace ahead
   - (A)ttitude- maintain correct attitude apply appropriate correction
   - (P)erformance- maintaining the correct Altitude, Direction and in balance, confirm RPM setting and check Oil Temperatures and Pressures every five cycles.

9.5.2 Procedure for Increasing Airspeed from Slow to Fast Cruise

Pre Manoeuvre:

1. Select: Reference point

Reference heading

Reference Altitude

2. Confirm Safe by Lookout
3. Commence Manoeuvre
   - (P)ower- Increase to _________, maintain balance
   - (A)ttitude- roughly 5 fingers on top of the dash board to horizon
   - (S)peed will approximately be 95kts - 110kts depending on aircraft type and must have (S)tabilised
   - (T)rim to relieve control column pressure to assist in maintaining straight and level attitude
4. Monitoring Scan: A.L.A.P.

Table 9-4 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Through Daily Inspection Maintenance Release
Pilot Flying	I have control/You have control Procedure
Engine Limitations	During acceleration, scan to RPM to ensure the red line isn't exceeded
Traffic	Vigilant Lookout (A.L.A.P.) Use of Radio to Improve Traffic Awareness
Training Area Boundaries	Use of VTC Visual Position Fixing of Major Features in Training Area to Identify Boundaries

10 Climbing

Figure 10-1 Climbing

10.1 Aim

To apply a Power and Attitude to achieve desired aircraft climb performance; this conducted onto a nominated heading, to a desired altitude and all whilst remaining in balance.

10.2 Objectives

- Configure and handle the aircraft to achieve desired climb performance
- Recognise and accurately apply the applicable mnemonics for Climb
- Recall the required Climb Speeds for Best Angle, Best Rate and Cruise Climb
- Maintain Constant Airspeed +/- 5 KIAS
- Maintain Constant Heading +/-5°
- Level off onto nominated altitude of +/- 150 feet
- Maintain Balance within ¼ Ball
- Consider the potential threats and errors of the exercise and manage these appropriately

10.3 Application

- After Take-off
- To change cruise level
- Go around

10.4 Revision

POWER + ATTITUDE = PERFORMANCE

Best Rate of Climb: Provides Maximum Height Gain in Minimum Time; used when pilot desires to reach nominated altitude as quickly as possible.

BROC: Power (Full) + Attitude (Dash on Horizon) = C152 Performance 67 KIAS

PA28 Performance 79 KIAS

C172R Performance 79 KIAS

Best Angle of Climb: Provides Maximum Height Gain in Minimum Ground Distance; used when pilot needs optimum obstacle clearance.

BAOC: Power (Full) + Attitude (Above Horizon) = C152 Performance 55 KIAS

PA28 Performance 63 KIAS

C172R Performance 60 KIAS

Cruise Climb: Provides better ground distance gain for an acceptable rate and angle of climb.

Cruise Climb: Power (Full) + Attitude (Below Horizon) = C152 Performance 75 KIAS

PA28 Performance 87 KIAS

C172R Performance 90 KIAS

10.5 Air Exercise

10.5.1 Best Rate of Climb (BROC)

Pre- Manoeuvre:

1. Select Reference point
   Reference heading
   Reference Altitude
2. Confirm Safe by Lookout
3. Commence Manoeuvre:
   – Power - smoothly apply full throttle

- Attitude - raise the nose to the climb attitude as shown below.
- Speed - establish BROC airspeed (depending on aircraft type)
- Trim - as required

4. Monitoring Scan: - A Attitude - as shown above
   - L Lookout - in climb path every 500’
   - A Attitude - check you are maintaining attitude as shown above
     P Performance -
     - Speed/ASI
     - Direction/D.G
     - Balance/ Turn co-ordinator
     - Oil temperature and pressure
     - Altitude (approaching reference)
5. Exit Manoeuvre (Anticipate Level Off by 10% ROC)
   - A Attitude – Gradually Lower nose to Straight and Level Attitude
   - S Speed - Allow speed to increase to cruise airspeed
   - P Power – When at cruise speed reduce to cruise power setting
   - T Trim – To relieve control column pressure
6. Post Manoeuvre Checks

Confirm Reference Point

Reference Heading

Reference Altitude

10.5.2 Best Angle of Climb (BAOC)

- Work cycle same as Best Rate of Climb
- More Rudder will be required to maintain balance, controls less effective at slower speed and significantly higher nose attitude as illustrated below.
- Used for maximum obstacle clearance
- Speed BAOC (depending on aircraft type)

Figure 10-2 Best Angle of Climb

Figure 10-3 Best Angle of Climb

10.5.3 Cruise Climb (CRZ Climb)

- Work cycle same as BAOC and BROC
- Used to increase distance covered over ground when obstacle clearance is not a primary consideration
- Speed 75Kts(C152), 87Kts(PA28), 90Kts(C172)
- Attitude lower than BROC

Figure 10-4 Cruise Climb

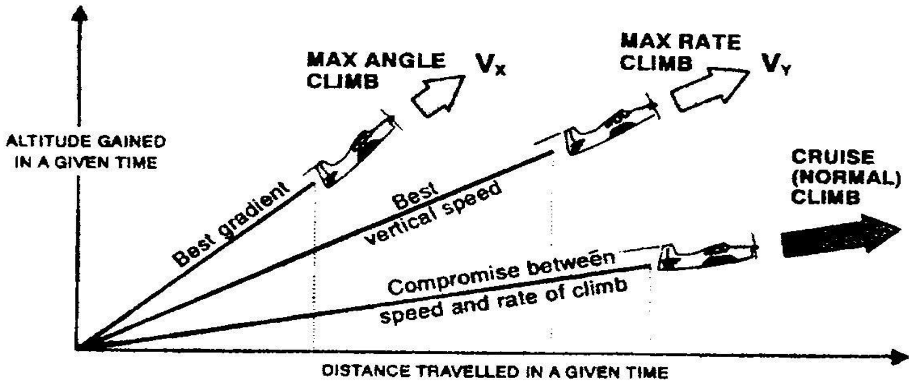

Table 10-1 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Through Daily Inspection Maintenance Release
Pilot Flying	I have control/You have control Procedure
Engine	Monitor Engine Temps and Pressures lower nose and reduce power if required
Traffic	Vigilant Lookout (A.L.A.P.) Use of Radio to Improve Traffic Awareness
Training Area	Use of VTC to identify CTA steps Ensure remain within T/A Boundaries Do not climb above 2500’ within 3nm YMMB

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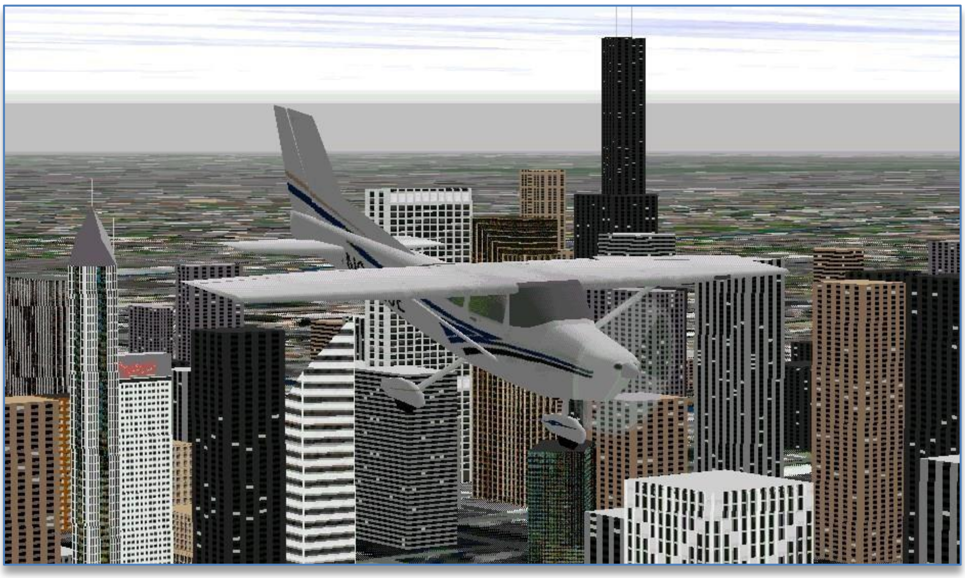
11 Descending

Figure 11-1 Descending



11.1 Aim

To correctly apply power and attitude to achieve a desired descent performance all onto a nominated heading and altitude whilst remaining balanced.

11.2 Objectives

- Configure and handle the aircraft to achieve desired descent performance
- Recognise and accurately apply the applicable mnemonics for descent
- Recall the required descent configurations and apply the appropriate descent for operational requirements
- Recognise the Effects of Flap on Descent Performance
- Maintain Constant Airspeed +/- 5 KIAS or +5 KIAS -0 KIAS in the glide
- Maintain Constant Heading +/-5°
- Level off onto nominated altitude of +/- 150 feet
- Cruise Descent ROD +/- 150 FPM
- Maintain Balance within ¼ Ball
- Consider the potential threats and errors of the exercise and manage these appropriately

11.3 Application

- Approach to land
- To change cruising level
- Glide without power

11.4 Revision

POWER	**+**	**ATTITUDE**	**=**	**PERFORMANCE**
IDLE POWER	**+**	**GLIDE ATTITUDE**	**=**	**73 Kts (PA28)**
			=	**63 Kts (C172R)**
			=	**60 Kts (C152)**
2100RPM	**+**	**5 Finger**	**=**	**Cruise Descent (PA28)**
2000 RPM	**+**	**4 Finger**	**=**	**Cruise Descent (C172R)**
2000 RPM	**+**	**4 Finger**	**=**	**Cruise Descent (C152)**

11.5 Air Exercise

11.5.1 Glide Descent

Pre Manoeuvre:

1. Select Reference point

Reference heading

Reference Altitude

2. Confirm Safe by Lookout
3. Commence Manoeuvre:
   - Power - smoothly reduce power to idle (apply carby heat if applicable)
   - Attitude - raise the nose to reduce speed then apply descent attitude shown below.
   - Speed –Once speed has stabilised
   - Trim – To relieve Control Column Pressure

Figure 11-2 Commence Manoeuvre

4. Monitoring Scan: - A Attitude - as shown above

   – L Lookout - in descent path
   – A Attitude - check you are maintaining attitude as shown above
   P Performance - Speed/ASI
      – Direction/D.G
      – Balance/ Turn co-ordinator
      – Altitude (approaching reference)
      – Oil Temps and Pressures and warm engine every 1000’

5. Exit Manoeuvre (Anticipate Level off by 10% ROD)

   – P Power – Increase to Cruise Power Setting
   – A Attitude – Allow nose to raise to cruise attitude then hold (Considerable Forward Pressure will be required)
   – S Speed – Wait for Speed to Increase to cruise and stabilise
   – T Trim – To relieve control column pressure (Aircraft will be significantly out of trim)

11.5.2 Cruise Descent (CRZ): Used for normal descents Pre

Manoeuvre:

1. Select Reference point
   Reference heading
   Reference Altitude
2. Confirm Safe by Lookout
3. Commence Manoeuvre:
   - Power - smoothly reduce power to required RPM
   - Attitude – Allow nose to lower to descent attitude shown below
   - Speed –Once speed has stabilised
   - Trim – To relieve Control Column Pressure Not much will be required if accurately trimmed pre entry

Figure 11-3 Commence Manoeuvre

4. Monitoring Scan: - A Attitude - as shown above
   - L Lookout - in descent path
   - A Attitude - check you are maintaining attitude as shown above
     P Performance - Speed/ASI

– Direction/D.G
– Balance/ Turn co-ordinator
– VSI
– Altitude (approaching reference)

5. Exit Manoeuvre (Anticipate Level off by 10% ROD)

– P Power – Increase to Cruise Power Setting
– A Attitude – Allow nose to raise to cruise attitude then hold
– S Speed – Wait for Speed to Increase to cruise speed and stabilise
– T Trim – To relieve control column pressure

Figure 11-4 Exit Manoeuvre

6. Post Manoeuvre Checks

Confirm Reference Point

Reference Heading

Reference Altitude

11.5.3 Effect of Flap

- Increase in Drag

- Increase in Rate of Descent
- Increase in Angle of Descent
- Better forward visibility as shown on right

Table 11-1 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Through Daily Inspection Maintenance Release
Pilot Flying	I have control/You have control Procedure
Engine	Monitor Engine Temps and Pressures and during glide and warm engine every 1000’
Traffic	Vigilant Lookout (A.L.A.P.) Use of Radio to Improve Traffic Awareness
Training Area	FN5 Not Below 500’ over unpopulated areas Not Below 1000’ over populated areas

12 Medium Level Turns

12.1 Aim

To be able to change direction of the aircraft using the adopted turn procedure, onto a nominated heading and altitude whilst remaining in balance.

12.2 Objective

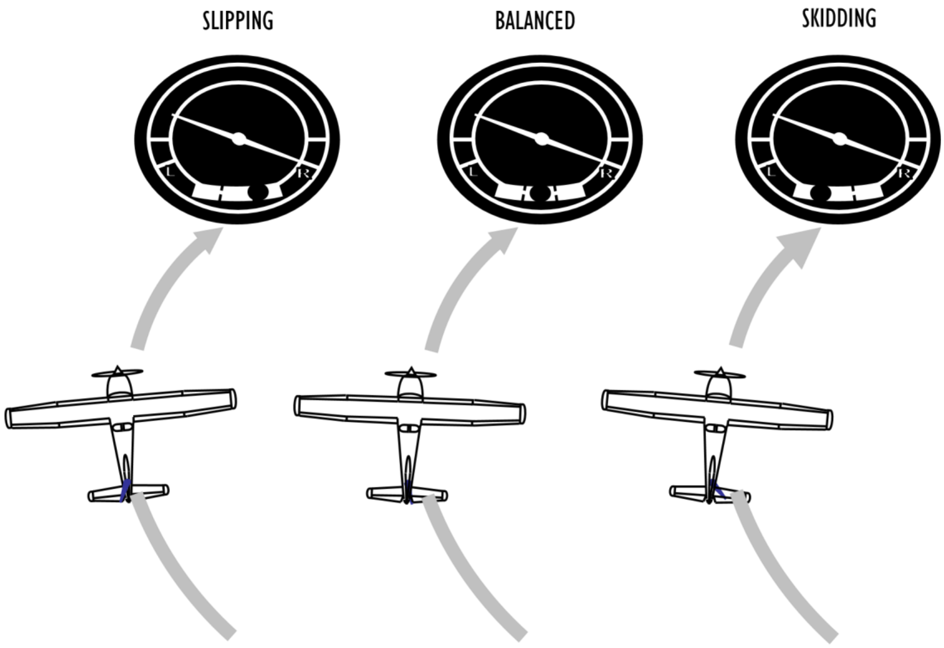
- Recognise and maintain the attitude required to establish the aircraft in a medium level turn.
- Learn to Co-ordinate aileron, rudder and elevator inputs during the entry and exit of a medium level turn.
- Successfully apply required corrections during the turn to maintain the correct attitudes in the pitch, roll and yaw sense
- Maintain 30° AOB to +/- 5°
- Maintain Altitude to +/- 150'
- Maintain balance within ¼ ball
- Exit turn onto a nominated heading within +/- 5°
- Consider the potential threats and errors of the exercise and manage these appropriately

12.3 Application

Changing heading whilst in flight.

12.4 Revision

Figure 12-1 Balance in a Turn



12.5 Air Exercise

Initially Revise, straight and level flight in the various cruise schedules

12.5.1 Pre Manoeuvre

1. Select Reference point

Reference heading

Reference Altitude

2. Confirm Safe by Lookout (Finish lookout in the actual intended direction of turn).

3. Commence Manoeuvre:

   - Entry (inputs are coordinated together): -
   - (B)ank to 30º

Figure 12-2 Bank to 30º

– (B)alance with rudder to keep the ball in the centre

Figure 12-3 Balance with Rudder to Keep Ball in the Centre

– (B)ackpressure to maintain altitude

4. Monitoring Scan: -
   - A Attitude – as shown above (observe where the horizon intersects with the dash and canopy)
   - L Lookout – in direction of turn
   - A Attitude – Confirm attitude is maintained as shown above P Performance - Artificial Horizon
     - Altitude
     - Balance/Turn co-ordinator
     - Directional Gyro approaching reference heading
5. Exit Manoeuvre (Anticipate Exit ½ AOB)
   - Exit (inputs are coordinated together): -
   - (B)ank - opposite to level wings
   - (B)alance - with rudder
   - (B)ackpressure - relax the backpressure to return to Straight and Level Attitude
6. Post Manoeuvre Checks

   Confirm Reference Point

   Reference Heading

   Reference Altitude

Initially Turns will be practiced through 360° Change in direction, then onto to nominated headings.

Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Through Daily Inspection Maintenance Release
Pilot Flying	I have control/You have control Procedure

Threat and Error	Management
Engine	Monitor Engine Temps and Pressures and during glide and warm engine every 1000’
Traffic	Vigilant Lookout (A.L.A.P.) Use of Radio to Improve Traffic Awareness
Training Area Boundaries	Use VTC to Position Fix Execute a MLT to remain within Boundaries
Manoeuvre Tolerances	Use attitude to Identify and Correct Apply Aileron, Rudder or Elevator appropriately to correct

13 Climbing and Descending Turns

13.1 Aim

To execute controlled turns in the climb or descent, onto a nominated heading and altitude whilst remaining in balance.

13.2 Objectives

To turn the aircraft at an acceptable rate whilst maintaining a satisfactory level of climb performance:

- Constant IAS +/-5kts.
- Constant Angle of bank 15 degrees +/- 5°.
- Maintaining balance with rudder.

To turn the aircraft whilst established in a descent at a:

- Constant IAS 70 kts(C152/C172), (80 kts PA28) +/-5 knots .
- Constant Angle of bank 30° +/- 5°.
- Maintaining balance with rudder.
- Consider the potential threats and errors of the exercise and manage these appropriately

13.3 Application

Change heading during a climb or descent.

Used in the Circuit on crosswind, base and final and sometimes onto downwind.

13.4 Revision

Banking Tendency in a Climbing Turn:

Overbank / Underbank

Banking Tendency in a Descending Turn:

Overbank / Underbank

13.5 Air Exercise

13.5.1 Climbing Turns

Pre Manoeuvre:

1. Select Reference point

Reference heading

Reference Altitude

2. Confirm Safe by Lookout (Lookout in direction of turn and above).

3. Entry into Climb

Establish Aircraft in desired Climb Profile

4. Entry into Turn

- (B)ank to 15° or rate 1 whichever is the lesser,
- (B)alance with rudder
- (B)ackpressure reduce slightly to maintain climb speed.

Figure 13-1 Entry into Turn

5. Monitoring Scan

- Attitude - maintain correct attitude.
- Lookout - lookout in direction of turn and above in direction of climb.
- Attitude - check attitude maintained.
- Performance - A/H 15 degrees or Rate 1 – 67Kts(C152), 79Kts(C172/PA28) (BROC) – balance – Directional Gyro.
- If performance is not achieved make adjustments with attitude.

6. Exit Manoeuvre (Anticipate Exit ½ AOB)

- Exit (inputs are coordinated together): -
- (B)ank - opposite to level wings
- (B)alance - with rudder
- (B)ackpressure – increase the backpressure to return to Climb attitude.

7. Exit Climb

8. Post Manoeuvre Checks

Confirm Reference Point

Reference Heading

Reference Altitude

13.5.2 Descending Turns

Pre Manoeuvre:

1. Select Reference point

Reference heading

Reference Altitude

2. Confirm Safe by Lookout (In direction of turn and below).

3. Entry into Descent

Establish Aircraft in desired Descent Profile

4. Entry into Turn

   - (B)ank to roll on bank to 30 degrees., (B)alance with rudder
   - (B)ackpressure increase slightly to maintain rate of descent or if in glide reduce backpressure to maintain speed.

Figure 13-2 Entry into Turn

5. Monitoring Scan

   - Attitude - maintain correct attitude.
   - Lookout - lookout in direction of turn and below in direction of descent.
   - Attitude - check attitude is maintained.
   - Performance - A/H 30° - IAS – balance – Directional Gyro.
   - If performance is not achieved make adjustments with attitude.

6. Exit Manoeuvre (Anticipate Exit ½ AOB)

   - Exit (inputs are coordinated together): -
   - (B)ank - opposite to level wings
   - (B)alance - with rudder
   - (B)ackpressure –to return to desired descent attitude.

7. Exit Descent

8. Post Manoeuvre Checks

Confirm Reference Point

Reference Heading

Reference Altitude

Table 13-1 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Through Daily Inspection Maintenance Release
Pilot Flying	I have control/You have control Procedure
Traffic	Vigilant Lookout (A.L.A.P.) Use of Radio to Improve Traffic Awareness
Training Area Boundaries	Use VTC to Position Fix
Instrument Fixation	Use attitude to Identify and Correct Apply Aileron, Rudder or Elevator appropriately to correct

14 Stalling and Slow Flight

Figure 14-1 Stalling and Slow Flight

14.1 Aim

To learn to recognise the symptoms approaching the stall to prevent inadvertent stall entry, and to be able to recover from a fully developed stall with minimum of height loss.

14.2 Objectives

- To recognise the symptoms approaching the stall – “Incipient Stall”
- To recover the aircraft in from and Incipient Stall
- Balance Aircraft to ¼ ball during entry and recovery
- Maintain Altitude on entry to +/- 150’
- Maintain Heading on entry and recovery to +/- 5°
- To recover from a stall with minimum height loss consistent with aircraft type
- Manage the Reduced Effectiveness of Controls approaching the stall Recover from a wing drop using the correct recovery technique.
- Consider the potential threats and errors of the exercise and manage these appropriately

14.3 Application

- Slow speed flight Configurations such as approach to landing and go around are potentially high risk manoeuvres for a stall occurring.

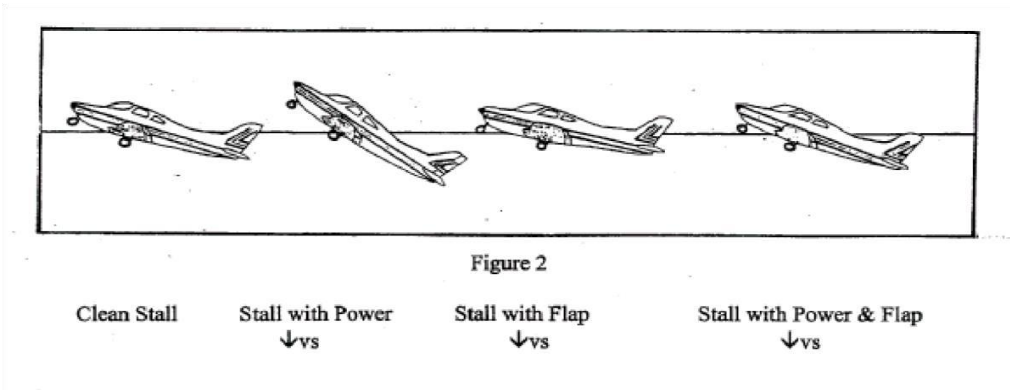
- Assists in developing handling skills for landing.

14.4 Revision

Table 14-1 Effects on Stall Speeds at MTOW

Type of Stall	Speed	Attitude
Stall Clean	C152 40kts, C172R 44kts, PA28 50kts	Clean Stall Attitude
Stall with Flap	C152 35kts, C172R 33kts, PA28 44kts	Lower Nose Attitude
Stall with Power	In Stall Speed	Higher Nose Attitude
Stall with Power and Flap	In Stall Speed	Similar to Clean

Figure 14-2 Effects on Stall Speeds at MTOW



Stall recovery may require counterintuitive control inputs (in so far as the training received before the first stalling lesson) by the pilot. Incorrect recovery control inputs may exacerbate the stall, delay recovery or trigger adverse undesired aircraft states. Understanding, discipline and a conscious effort will be required to overcome previously learned, potentially habitual behaviour.

14.4.1 Aircraft Behaviour: Approaching the Stall

1. Control column aft/Up elevator (apparent in all stalls)
   - Elevator directly controls Angle of Attack (AoA)
2. Higher than expected pitch attitude
   - Angle of Attack is a function of pitch attitude and flight path
   - Not apparent in accelerated flight (steep turns and pull outs from dives)
3. Low (unaccelerated stall) or decreasing Indicated Air Speed (IAS) (all stalls)
   - In unaccelerated (steady) flight, low indicated airspeed relates to flight at a high Angle of Attack

   - Decreasing Indicated Air Speed is indicative of flight at an increasing Angle of Attack
4. Decreased control effectiveness (unaccelerated stall)
   - Associated with flight at low Indicated Air Speed
5. Changes in airframe noise
   - Decreasing slipstream noise levels
   - Changes in slipstream noise
6. Control buffet and airframe vibration
   - Buffet may not be apparent on all aircraft types
   - Some aircraft types may exhibit vibration associated with airflow separation on the main-plane
7. Stall warner
   - If functioning, will activate at a pre-determined Angle of Attack approaching the critical Angle of Attack

14.4.2 Aircraft behaviour Stalled

1. Un-commanded pitch down
   - Changes in the main-plane's down-wash influence on the tail plane
   - Pitch balance changes associated with changes in the position of the centre of pressure
   - Decrease in lift causing a change in the aircraft's direction of flight and the aircraft's pitch stability resulting in pitch down
2. Un-commanded roll
   - Asymmetric stall leading to lift inequity between the wings causing roll toward the stalled (or more stalled) wing
3. Low/steady Indicated Airspeed
   - Due to increase in drag in spite of increasing rate of descent and low nose attitude
4. Developing Rate of Descent
   - Inability to maintain level flight with the high drag associated with the aerodynamic stall b. Decrease in lift (but not significant)
5. Pitch oscillations/Airframe vibration
   - Changes in the influence of down-wash from the main-plane on the tail plane:

     Stall → pitch down → un-stall → pitch up → stall → etc.
   - Some aircraft types may exhibit vibration associated with airflow separation on the main-plane

14.5 Air Exercise

14.5.1 Pre-Manoeuvres Checks - HASELL

- H - Height sufficient to recover by 3000'AGL
- A - Airframe safely configured for maneuvers (flap retracted)
- S - Security of
  - Hatches
  - Harnesses
  - Loose articles
  - Instruments caged
- E - Engine operating normally
  - Oil temperature
  - Oil pressure
  - Cylinder head temperature
  - Fuel quantity
  - Fuel Pressure & pump on if required
  - Mixture set
  - RPM set
- L - Location suitable
  - Aerobatics area
  - Not over built up areas
- L - Look-out and Cleared Airspace Procedure
  - Traffic
  - VMC
  - 360° turn (minimum)

14.5.2 Intermediate Manoeuvres Checks - HELL

- H – Height sufficient to recover by 3000'AGL
- E – Engine continues to operate normally
- L – Location suitable o Aerobatics area
  - Not over built up areas
- L - Look-out and Cleared Airspace Procedure o Traffic
  - VMC
  - 90° turn (minimum) between stalls (box pattern)

14.5.3 Stall Entry

- Set power, carburettor heat on if applicable
- Set flap
- Establish desired flight path (level, turning, climbing, descending or combination)

- Maintain entry heading, altitude and balance for level entry
- Identify aircraft behaviour approaching the stall, incipient stall

14.5.4 Recover to Normal Level Flight from the Incipient Stall

- On activation of the stall warner, carburettor heat off if applicable
- Smoothly apply full power, anticipate and prevent undesired pitch up and left yaw
- Adjust attitude to maintain altitude
- Resume level flight on entry heading, altitude and in balance

14.5.5 Recover to Normal Flight with Idle Power

- Move control column forward sufficient to un-stall the wings
- Aileron neutral
- Use rudder to prevent yaw and roll from developing
- Set glide descent attitude
- Resume normal flight on entry heading and in balance

14.5.6 Recover to Normal Level Flight with the Aid of Full Power

- On activation of the stall warner, carburettor heat off if applicable
- Identify aircraft behaviour at the stall
- Move control column forward sufficient to un-stall the wings
- Aileron neutral
- Use rudder to prevent yaw and roll from developing
- Smoothly apply full power, anticipate and prevent undesired pitch up and left yaw
- When recovered from stalled condition of flight use smooth coordinated control inputs to set a wings level and moderate climb attitude Post stall
- Climb power set
- Climb attitude set
- Flap retract
- Commence turn to nominated heading, note heading deviation
- Climb to nominated altitude, note altitude deviation

14.5.7 Recover to Normal Level Flight following Wing Drop/Incipient Spin

- On activation of the stall warner, carburettor heat off if applicable
- Identify aircraft behaviour at the stall, un-commanded roll
- Move control column forward sufficient to un-stall the wings

- Aileron neutral
- Use rudder to prevent yaw and roll from further developing o Angle of Bank ≤ 45˚ - smoothly apply full power, anticipate and prevent undesired pitch up and left yaw
  - Angle of Bank > 45˚ - close throttle
- When recovered from stalled condition of flight use smooth coordinated control inputs to set a wings level, moderate climb attitude and smoothly apply full power, anticipate and prevent undesired pitch up and left yaw

14.5.8 Post Stall

- Climb power set
- Climb attitude set
- Flap retract
- Commence turn to nominated heading, note heading deviation
- Climb to nominated altitude, note altitude deviation

CAUTION

Stall with wing drop/incipient spin with flap extended will require prompt action to prevent exceedances of flap extension speed (V_{FE})

Early in the incipient phase, inertial moments, though increasing in influence, permit normal stall recovery methods to be used effectively. If doubt about the incipient spin recovery technique exists, the spin recovery technique described in the Aircraft Flight Manual (AFM) will result in timely recoveries. Cessna states that the use of the spin recovery procedure should be used in all phases of the spin.

14.5.9 Stall with Flap Extended (including Full Flap)

- More abrupt stall characteristics
- Slower stall recovery
- Greater height loss
- Anticipate and prevent stronger undesired pitch up

14.5.10 Stall with Power (Including Full Power)

- More abrupt stall characteristics
- Anticipate increased tendency for wing-drop/incipient spin
- Greater height loss

14.5.11 Stall in Approach Configuration (Partial Power and Flap Extended)

- More abrupt stall characteristics
- Anticipate increased tendency for wing-drop/incipient spin
- Greater height loss
- Anticipate and prevent stronger undesired pitch up

Stall in a climb/turn/descent (climbing turn/descending turn)

- Anticipate wing-drop opposite to turn direction in a climbing turn stall
- Anticipate increased indicated stalling speed in turning flight stall

Table 14-2 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Thorough Daily Inspection Stall Warning Horn
Pilot Flying	I have control/You have control Procedure
Traffic	Vigilant Lookout (A.L.A.P.) HASELL Checks
Wing Drop	Rudder Control for Wings Level at slow speed
Aircraft Configuration	Flaps: Pre Entry Visually Confirm below VFE prior to extension Recovery, Ensure VFE is not exceeded and careful flap retraction after confirming positive rate of climb and safe airspeed.

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15 Circuits

Figure 15-1 Circuits

15.1 Aim

To be able to safely execute a complete circuit all whilst maintaining a satisfactory level of situational awareness and appropriately apply relevant procedures and checks.

15.2 Objectives

- Safely fly the aircraft through all legs of the circuit whilst maintaining a standard pattern, the required speeds, and correct spacing and tracks.
- Implement the required Class D radio calls and correctly comply with ATC instructions
- Be able to adjust the circuit pattern and speed to manage spacing from other traffic that is either established in or joining the circuit.
- Implement and appropriately apply the required procedures and checks in the circuit area
- Develop judgement of a safe approach and recognise a high or low profile using the aspect of the runway
- Be able to correct for errors in the approach through use of power and attitude
- On base recognise the correct profile, adjusting Rate of Descent with Power and Airspeed with attitude.

- On final, identify and hold an aimpoint; using elevator, and use power to maintain speed.
- Consistently recognise a safe flaring height and execute a landing safely (without crosswind)
- Be able to recognise an unsafe approach through contribution or a combination of the following factors; airspeed, profile, wind, traffic or any other environmental considerations that would necessitate a go around
- Consider the potential threats and errors of the exercise and manage these appropriately

15.3 Application

A standard (typically left hand) circuit pattern is used to create a predictable flow of traffic; to assist both the pilot and

ATC to keep separation from other aircraft. It also assists in maintaining a safe and standardised profile for the approach.

Refer to the ERSA for local operational requirements that may necessitate a non standard circuit direction or altitude.

15.4 Air Exercise

15.4.1 On the Ground

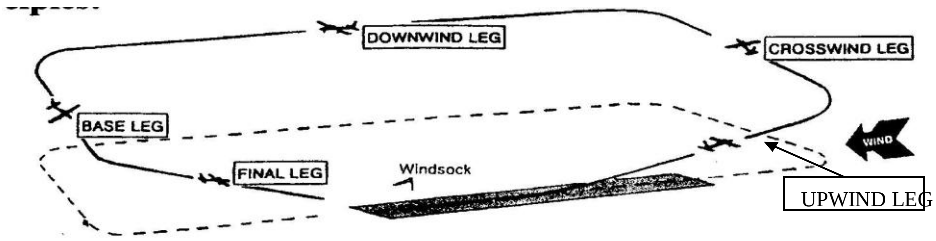
1. Develop a mental picture of aerodrome conditions:
   - In addition to all other pre flight procedures take the time to listen to the ATIS to obtain an understanding of the wind and runway in use. The temperature and pressure will also give you some understanding of expected engine performance.
   - Listen to the Circuit Frequency for traffic density.
   - Take 5 minutes to consider the impact of these conditions on your exercise.
2. Pre-flight:
   - During your daily inspection study the windsock for gusts and decreases in wind strength and look for any changes in direction.
3. Start Up Call:
   - Class D Airspace Procedures require a start approval for circuits. The call will be made prior to start up on the ground frequency (119.9):
     - Pilot: “Moorabbin Ground, C152/C172/PA28, APTA, request start approval for Circuits, received information.”
     - ATC: “APTA, start approved for Runway XX L/R”
     - Pilot: “XX L/R, APTA”
   - Occasionally ATC will not issue a start approval supplied with a designated runway, if this is the case it simply because they

have not decided which Runway they want you to execute circuits on (normally due to congestion). They will then issue the designated runway for use during your taxi clearance call. If it is very busy and ATC cannot fit you in they will simply read back:

- ATC: “APTA, start not approved call again in xx minutes”
- Pilot: “APTA”

4. Run Up Bay:
   - Reconfirm ATIS and have another look at the windsock to assist in recognising any changes in conditions to further develop an expectation of handling requirements in the circuit area.
   - Take Off Safety Brief; is very important. It is strongly recommended that you conduct this both during dual and solo exercises. It is primarily used to minimise reaction time to an engine failure and to ensure all actions are pre meditated to prevent any possible confusion and assist in making correct, efficient decisions in a potentially high pressure environment.
5. Holding Point:
   - C152/C172: Manoeuvre the aircraft, just before the holding point so that the pilot can see the base and final leg of the circuit and look for traffic prior to executing the line up checks and making ready call.
   - PA28: Manoeuvre the aircraft to the holding point in line with the taxi line. Low wing will allow the pilot to have a view of the base and final leg.
6. Line Up:
   - To provide as much runway ahead as possible.
   - Ensure the aircraft is on centre line and nose wheel is straight prior to applying full power for the take off run.
7. Take off:
   - Smoothly apply full power countering the effect of slipstream with right rudder.
   - As the aircraft is accelerating confirm airspeed is increasing and oil temperatures and pressures are in the green, otherwise abort take off.
   - Approaching 45kts(C152)/55 Kts(C172 & PA28) begin applying backpressure to Rotate at 50(C152)/60 Kts(C172 & PA28)
   - Once airborne set the Best Rate of Climb attitude 67Kts(C152)/79Kts(C172R & PA28).

Figure 15-2 The Circuit



8. Upwind:

   - Confirm tracking, maintain heading to continue on an upwind track, ensure aircraft is not drifting toward or into the parallel runway's upwind leg.
   - C152/C172: Passing 300' landing and taxi light off
   - PA28: Passing 300' landing light and fuel pump off
   - Passing 400' lookout (completing lookout in the direction of circuit)
   - If slower moving or similar speed traffic is too close extend the upwind leg otherwise,
   - Passing 550' commence a climbing turn onto crosswind leg

9. Crosswind:

   - Confirm track is perpendicular (90°) to runway
   - Lookout for traffic o Continue climb to 1000' and level off,
   - Or if approaching downwind turning point before this; commence a climbing turn onto downwind leg. If possible during turn execute downwind call.

10. Downwind:

   - Check (H)eight, is level and maintaining 1000'
   - Check (H)eading, is providing a paralleled track to runway
   - Check (S)peed, slow down if necessary for traffic otherwise maintain normal cruise
   - Check (S)pacing For Left Hand Circuits C152/C172 runway is cutting through 1/3 way from top of strut, PA28 runway is intersecting 1/3 way through wing For Right Hand Circuits C152/C172 runway is cutting ½ way through strut PA28 runway is intersecting ½ way up wing
   - Execute landing checks
   - C152/C172 Abeam threshold reduce power to 2000RPM and extend first stage of flap
   - C152/PA28 Abeam threshold turn carburettor heat on
   - Lookout
     - Approximately 450 past the landing threshold (1.5 x runway length @ MB)
     - Reduce power 1500 RPM(C152/C172)/1700 RPM(PA28) and commence level turn onto Base leg

11. Base:

   - Early base, hold 75Kts(C152)/80Kts with 2 stages of flap extended (C172 & PA28) o Mid base check height - 800 feet to confirm on Profile, if low add power to reduce rate of descent and raise nose to maintain speed. If high, reduce power to increase rate of descent and lower nose to maintain speed.
   - Passing 700' slow aircraft to 70Kts(C152)/75Kts(C172/PA28) and commence a thorough lookout to clear upcoming turn onto final

  - At a position considering the effects of wind (normally about 600') commence turn onto final, during turn scan from attitude to runway and adjust the angle of bank as required to intercept centreline.

12. Final:

  - Must be established on final no lower than 550'
  - Once established on final reduce speed to 65Kts(C152)/70 Kts(C172/PA28)   Confirm (A)impoint is set correctly and held, using elevator to adjust
  - Confirm (C)entreline is running between pilots legs, adjust as required with ailerons i.e. roll to intercept
  - Confirm (A)irspeed is 65Kts(C152)/70 Kts(C172/PA28) and use power to adjust and correct speed
  - Continue the A.C.A scan using small, smooth, controlled inputs to correct for any undesired errors
  - Passing 300' begin to slow aircraft to 60Kts(C152)/65 Kts(C172/PA28). C152/PA28 Passing 300' turn carburettor heat off.
  - Approaching aimpoint passing 150' begin scanning from aimpoint to end of runway to judge the correct flaring height; to commence the transition from the approach to the landing.

Figure 15-3 Too Low

Figure 15-4 Too High

Figure 15-5 Normal

13. Landing:

    – At the correct height, commence flare, by reducing power to idle and raising nose to the straight and level attitude.
    – Hold off, and reduce the sink rate by continuing to raise the nose until the aircraft has touched down onto the runway.

14. Touch and Go:

    – Retract flaps and apply full power to commence take off sequence

15. Full stop Landing:

    – Gradually apply brakes and slow the aircraft to a safe exit speed.
    – Exit Runway, stop and execute after landing checks
    – Orientate and request a taxi clearance to return to parking area.

15.4.2 Considerations – Take-Off

Take off into wind will provide:

- The shortest ground run
- The lowest possible ground run
- Directional control improves
- The least strain on undercarriage

- The maximum angle of climb to give the best obstacle clearance The take off distance for any aeroplane is affected by:
- Gross weight
- Wind direction and strength
- Temperature and density of the air (Density Altitude)
- Humidity
- Runway slope and condition

Directional control can be affected by:

- Cross-winds
- Propeller slipstream
- Torque effect
- Gyroscopic effect (most noticeable on tail wheel aircraft)

The take off run can be reduced by the use of flaps, which at the optimum setting provides additional lift at low speeds by changing the aerofoil shape and/or the wing area. A flap setting greater than the optimum should not be used as the added drag may have a detrimental effect. The use of flap is particularly applicable to the short field take off.

15.4.3 Approach

Approach into Wind Provides:

- Steeper angle of descent thus giving best obstacle clearance and improving the view of the landing path.
- No tendency to drift.
- Lowest ground speed, therefore shortest runs during subsequent landing.
- Best directional control during the landing.

Wind gradient in an aircraft approaching to land can cause a reduction in I.A.S. This in turn may cause rapid sink followed by a heavy landing. If strong wind gradient is expected a higher than normal speed and extra power should be used.

Use of flaps during an approach will give:

- Steeper angle of descent for a given speed.
- Nose down attitude therefore better forward vision.
- Lower stall speed, permitting approach at a lower airspeed without reducing the safety margin.

The amount of flap will depend on the type of aircraft and the wind conditions prevailing. Normally the stronger the wind, less flap is required!

Flap is applied as required during the approach, however flap application should be complete and the aircraft trimmed by 400 feet A.G.L.

Powered Approach

This type of approach is used normally to make an approach to land.

- Set the aimpoint (threshold) in the windscreen in a position that will give correct approach path (approx 4 fingers above glare shield).
- The approach speed is controlled with the use of throttle, and the rate of descent/height/aspect is controlled with the elevator. Both of these controls will give you the correct performance for the approach path.

15.5 Landing

15.5.1 Landing into Wind

Similar considerations apply during landing as have already been outlined for take-off.

In normal conditions landings are made at the lowest possible speed which is close to the stalling speed.

Factors conducive to good landings:

- Aircraft trimmed correctly.
- On slope approach without excessive over/undershoot.
- Pilot relaxed and looking well ahead A well judged round out.
- “Holding off” remember as the aircraft decelerates the controls become less effective (similar to stall), therefore progressively larger control movements will be necessary.
- During landing sequence never move the control column forward!
- At the point of touchdown, hold control column still until nose wheel touches the ground.
- If hold-off is too high use power for correction or go-around
- If in doubt adopt baulked approach procedures and go around.
- Maintain attention throughout landing ground run, taxi, parking and shutdown.

Table 15-1 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Daily Inspection Maintenance Release
Crosswind	Do not land in X Wind greater than maximum demonstrated
Fuel	PA-28 Balanced tanks, change if required C152, C172, PA-28; check sufficient quantities
Parallel Runways	Ensure during Upwind correct tracking Go around, executed on circuit side

Threat and Error	Management
Traffic	Vigilant Lookout Communication with Instructor Radios Extend upwind or slow down on downwind to assist with maintaining sufficient spacing from other aircraft
Unstable Approach	Refer to Baulked Approach Procedure Execute a Go Around

16 Engine Failure After Take-Off

16.1 Aim

To be able to safely control the aircraft in the event of a simulated or actual engine failure after take off, whilst selecting the most suitable landing area available.

16.2 Objectives

- Recall the Take off Safety Brief, practically implementing actual conditions that will effect pilot action in the event of an engine failure after take off.
- Maintain Control of the aircraft after an actual or simulated engine failure.
- Maintain Glide speed +5 KIAS to -0 KIAS.
- Execute the most appropriate landing action and field dependant on glide distance available.
- If sufficient altitude available complete Immediate Actions
- Consider the effects of wind on Glide Performance
- Consider the potential threats and errors of the exercise and manage these appropriately

16.3 Application

Actions on occurrence of an engine failure after take off need to be executed with deliberate efficiency, to ensure that the safest possible outcome can be achieved in this high pressure limited time scenario. The pilot must be well rehearsed in this routine to provide the best possible chance of a positive outcome. Where the pilot and passengers can walk away unharmed.

16.4 Revision

16.4.1 Take Off Safety Brief

Today we are using runway ____. A zero flap departure with rotate speed of 60 knots. If I suffer a major malfunction prior to rotation I will close the throttle and stop ahead. If I suffer a major malfunction after rotation with runway remaining, I will lower the nose, select full flap and land ahead. If I suffer a major malfunction after take-off without any runway remaining, I will lower the nose to the best glide speed of _____ (60Kts C152), (65Kts C172R), (73Kts PA28) knots, select a field 30 degrees either side of my nose and land ahead selecting full flap, areas off runway ____ that can be used are _________________. If I suffer an engine failure on crosswind above 1000 feet I will elect to turn back towards the airfield and conduct a forced landing on runway ____. Any questions?

16.5 Air Exercise

Due to Operational Constraints at Moorabbin as highlighted in ERSA this exercise will be executed at Tooradin Aerodrome.

1. Engine Failure Before Rotation Speed below 30 KIAS:
   - Instructor will simulate engine failure using throttle.
   - Maintain Control
   - Apply Maximum Effective Braking
   - Backtrack or taxi to beginning of runway (traffic dependant)
2. Engine Failure Before Rotation Speed below 60 KIAS:
   - Instructor will simulate engine failure using throttle.
   - Maintain Control
   - Apply Maximum Effective Braking
   - Observe the increase in runway distance required
   - Backtrack or taxi to beginning of runway (traffic dependant)
3. Engine Failure After Take Off with No Runway Remaining
4. Instructor will simulate engine failure using throttle.
   - Maintain Control o Lower Nose to Maintain best glide speed (C152 60Kts, C172R 65Kts, PA28 73Kts)
   - Select a Field 30° either side of nose.
   - If time Permits execute Immediate Actions:

Table 16-1 Checks

C152/C172	PA-28
(C)heck For Fire (C)arby Heat On(C152)	(C)heck for Fire (C)arby Heat On
(F)uel Pump On(C172) (F)uel Quantity (F)uel Selection (F)uel Shut Off Valve In(C172)	(F)uel Pump On (F)uel Quantity (F)uel Selection
(M)ixture Rich	(M)ixture Rich
(S)witches Mags to Both	(S)witches Mags to Both

In Actual Engine Failure Attempt to Land Aircraft

5. Engine Failure After Take Off with No Runway Remaining above 1000’ Instructor will simulate engine failure using throttle.
   - Maintain Control

- Lower Nose to Maintain best glide speed (C152 60 Kts, C172R 65Kts, PA28 73Kts)
- Return to Airfield and Select best possible landing area. NB: Limit time in and number of turns to conserve height. o If time Permits execute Immediate Actions:

Table 16-2 Checks

C152/C172	PA-28
(C)heck For Fire (C)arby Heat On(C152)	(C)heck for Fire (C)arby Heat On
(F)uel Pump On(C172) (F)uel Quantity (F)uel Selection (F)uel Shut Off Valve In(C172)	(F)uel Pump On (F)uel Quantity (F)uel Selection
(M)ixture Rich	(M)ixture Rich
(S)witches Mags to Both	(S)witches Mags to Both

Table 16-3 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	Thorough Daily Inspection could prevent an engine failure
Fuel	Correct management in flight (fuel logs) and pre inspection could prevent an engine failure
EFATO at YMMB	Are not permitted (refer to ERSA)
Pilot Workload	Fly aircraft first, then prioritize landing area
Unfamiliar Aerodrome	Check ERSA and ALA guide for information Call Aerodrome Operator for Conditions Pre Flight Brief CTAF joins

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17 Glide Approach

17.1 Aim

To safely land the aircraft in a glide configuration onto the most appropriate runway taking into account the effects of wind on glide performance.

17.2 Objectives

- Maintain Glide Speed from +5KIAS to -0KIAS.
- Maintain Balance ¼ ball
- Use flap appropriately to control aimpoint on final
- Use attitude to maintain speed on final
- Recognise the effects of wind on glide performance and compensate for reductions in distance for increases in strength of wind.
- Be able to appropriately adjust glide plan to make airfield.
- Consider the potential threats and errors of the exercise and manage these appropriately

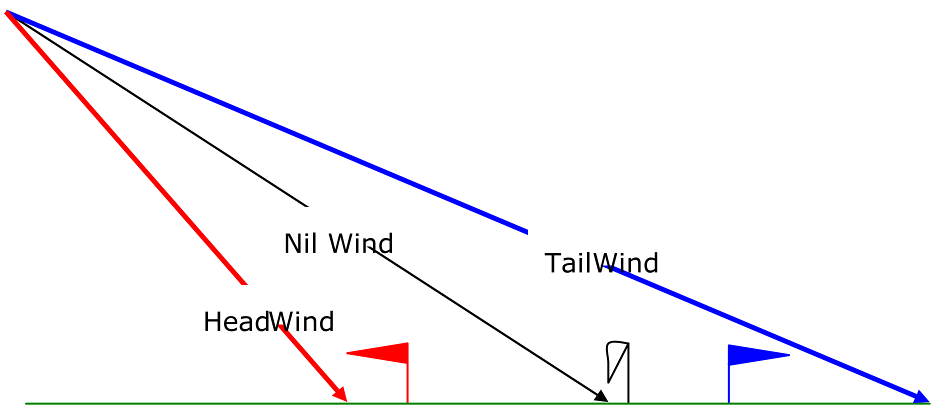
17.3 Application

The Glide approach is used for engine failures above 1000' where the pilot intends to land on the aerodrome. It also accurately simulates the last stages of the forced landing.

17.4 Revision

Effect of Wind on Glide Performance.

Figure 17-1 Effect of Wind on Glide Performance



Best Glide Speed for C152 = 60 Kts, C172R = 65 Kts, PA28 = 73 Kts

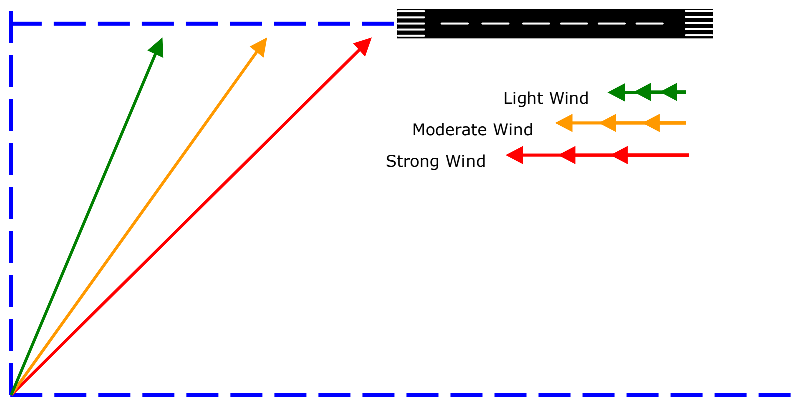
17.4.1 Effect of Speed on Glide Performance

- Reduction in speed below best glide speed = INCREASE/ DECREASE in range
- Increase in speed above best glide speed = INCREASE/ DECREASE in range

17.5 Air Exercise

1. Simulated Engine Failure Late Downwind
   - Maintain Control
   - Adopt Glide attitude (for C152 & PA28 turn Carburettor Heat On) Assess wind Strength
   - Turn directly toward most appropriate runway

Figure 17-2 Options for Plan in Varying Wind Strength



   - Once established in glide toward field and glide plan has been made, execute CFMS checks
   - As power is not available to control speed, use elevator / attitude to substitute for this and flap to control the aimpoint.
2. Simulated Engine Failure Abeam Landing Threshold
   - Maintain Control
   - Adopt Glide attitude
   - Assess wind Strength
   - Make plan, consider wind and decide when to turn base
   - On base leg track perpendicular (90°) to runway, make turn direct to field if gliding short of aimpoint.
   - Execute CFMS checks

Table 17-1 Threat and Error Management

Threat and Error	Management
Wind	Consider effects carefully plan 1/3 of way into field initially until you are certain you will make the runway

Threat and Error	Management
Engine	Careful application of power during touch and go C152/PA28, apply carburetor heat when idle
Glide Speed	Resist the temptation to raise nose if falling short of aimpoint, this will reduce glide distance and bring aircraft closer to stall

Intentionally Blank

18 Baulked Approach

18.1 Aim

To be able to recognise an unsafe approach and positively determine the need to execute a go around this all conducted to a safe standard.

18.2 Objectives

- Establish, recall and recognise (in flight) parameters that determine an unsafe approach.
- Initiate a go around once these parameters have been identified Execute a go around to the following standards:
  - Maintain BROC IAS nominated in AFM to +5KIAS -0KIAS
  - Retract Flap by stage whilst maintaining a positive rate of climb
  - Remain in Balance within ¼ ball
  - Establish the aircraft on parallel upwind track and maintain heading to +/-5°
- Consider the potential threats and errors of the exercise and manage these appropriately

18.3 Application

A go around is used by the pilot to abort an approach that is deemed unsafe. It is the final defence line for the pilot; if you ever feel uncomfortable, anxious or unsure of a successful outcome to the landing during the approach; a go around should be executed without further hesitation!

18.4 Balked Approach Criteria

Pilot in command perceives a hazard or a threat that may compromise: the safety of the approach to land, or the safety of the landing

On or more of the following criteria will dictate that a baulked approach be initiated

- Stable approach criteria exceeded: Airspeed/Height on profile/Centreline/Aircraft configuration
- Environmental considerations including but not limited to:
- Cross-wind/Tail-wind component in excess of pilot/aircraft limitations
- Turbulence exceeding stable approach criteria
- Decreasing visibility occludes view of runway
- Sun glare occludes view of runway

- Pilot reports of moderate/severe wind-shear on final
- The nominated safe height for a go-round is reached and a landing clearance has not been received
- The nominated safe height for a go-round is reached and the runway is occupied (or likely to be occupied) by: ▪ Aircraft
- Vehicles
- Animals
- The runway is marked as unserviceable (marked by X) or appears not to be serviceable
- Aircraft observed approaching a holding point to enter/cross the runway in a manner suggesting it may not stop short of the runway
- Aircraft observed taxiing (or will likely taxi) through the under-shoot area of the runway on which the approach to land is being made at an altitude that creates a collision risk
- Consider the effect of slipstream from large aircraft in the run-up bay directed across the runway
- The PIC is not satisfied the approach may be commenced or continued safely with the aircraft being followed not being sighted or being lost from sight
- A go-round can be initiated from downwind, base or long final
- The landing results in the aircraft being ballooned or bounced with the likelihood of a heavy landing to follow • A long landing/excessive float (Having insufficient remaining distance to safely stop)
- If in doubt; go around
- The decision to go-round remains at the discretion of the pilot in command
- ATC give an instruction to go-round (regardless of pilot perception for the necessity for the baulked approach)

18.5 Air Exercise

Execution of Go Around on Final at Moorabbin

- Recognise cause for go around and commence procedure
- Apply full power counter yaw with rudder (Carburettor Heat off for C152/PA28)
- Maintain control, set attitude to maintain safe IAS from AFM.
- Execute lookout (particularly for helicopters on western grass) and begin to manoeuvre aircraft to track parallel runway on circuit side. If possible make go around radio call, as ATC at this point will typically advise pilot of traffic.

NOTE:

This tracking requirement typically applies to airports with parallel runways, pilot would normally need to manoeuvre aircraft to track parallel runway on dead side.

- Refer to AFM for recommended IAS procedure and safe flap retract IAS.
- Confirm positive rate of climb, retract another stage of flap and raise nose to climb attitude.
- Confirm tracking parallel to runway; compensate for drift if required.
- Established in climb profile confirm positive rate of climb and retract final stage of flap.
- Plan crosswind turn, lookout for traffic ahead on upwind to ensure no one will be cut off with this turn. Otherwise continue to extend upwind to follow traffic.
- Make turn once above 500' AGL, search for aircraft early downwind to ensure no collision risk for downwind exists.
- Turn and Establish aircraft on downwind, be aware that this leg will most likely be shortened due to go around procedure, therefore less time available to prepare for approach.

Figure 18-1 Go Around Diagram

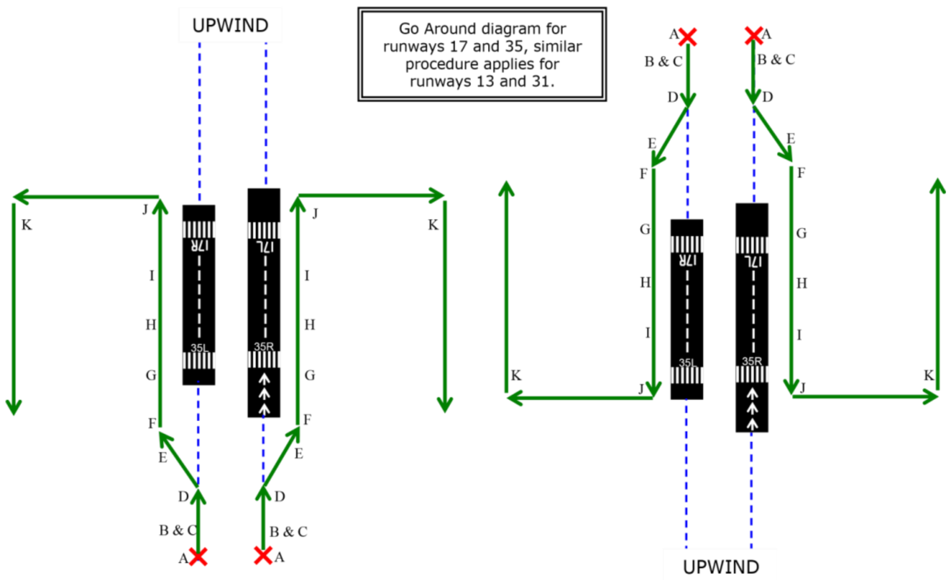


Table 18-1 Parameters - Undesired A/C States – Dictate Go-Around Necessary

Below 300 feet	Above 300 feet
Airspeed +/- 5 KIAS	Airspeed +/- 10 KIAS
Off Profile by +/- 100 feet	Off Profile by +/- 150 feet
Centerline corrections that require Changes in AOB >20º	Centerline corrections that require Changes in AOB >30º

Table 18-2 Threat and Error Management

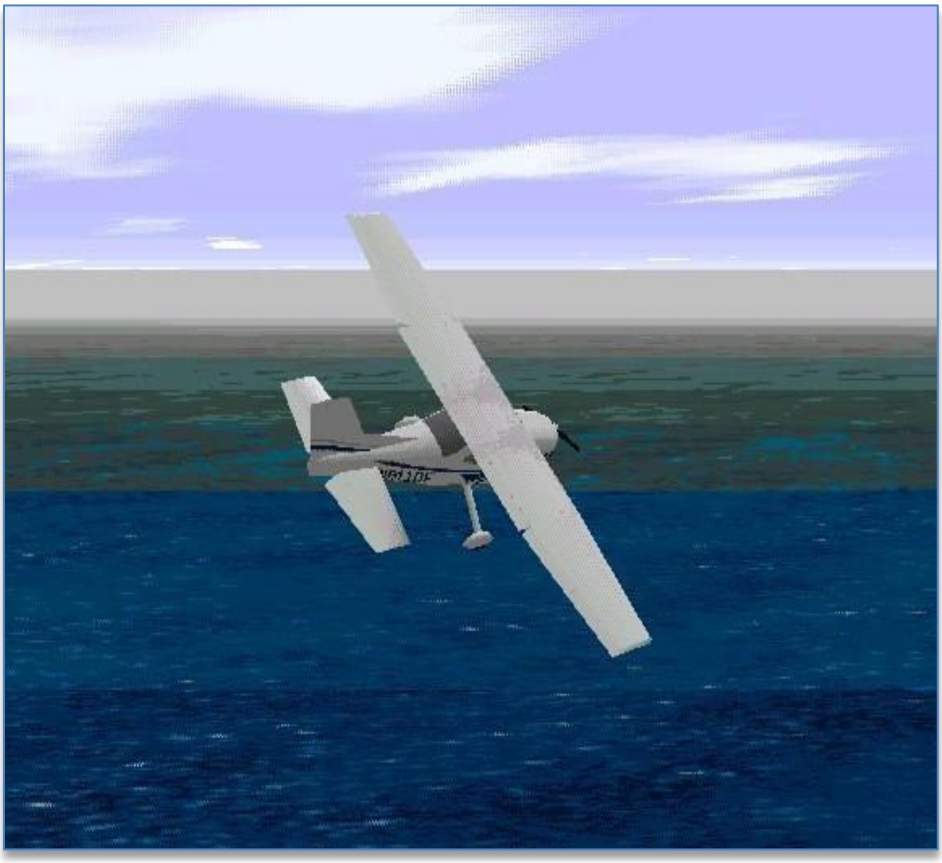
Threat and Error	Management
Stall Speed	Ensure speed is safe prior to raising nose to climb altitude
Wing Drop	High Power, full flap and slow speed, ensure at slow speed rudder is used to keep wings level
Wind	Be aware of drift, ensuring track is parallel to runway Gusts may induce undesired aircraft states
Workload	Prioritize Tasks, safe control of aircraft is number one priority, tracking and traffic as a secondary, then communication to tower for go around advisory call. If workload is too high ensure you prioritize as such. A radio call is not mandatory for this manoeuvre
Traffic	Ensure you execute a thorough lookout for traffic and anticipation of their position relative to your plan is carefully considered prior to making turns onto crosswind and downwind. Western side helicopter traffic exists both at Low level and on close downwind at 800 foot, consider this when planning turns and tracking along runway
Unsafe Approach	Execute a go around. The last defense line for the Pilot. If executed correctly it is the best option available to provide another chance for a more safe controlled approach into a more predictable and suitable environment
If ever in doubt, execute a go around	

19 Steep Level Turns

19.1 Aim

To safely execute a steep level turn at 45° onto a nominated heading; and to recognise the symptoms of and recover from a spiral dive.

Figure 19-1 Steep Level Turns



19.2 Objectives

- Maintain Angle of Bank +/-5°
- Maintain Altitude +/-150 feet
- Maintain Balance within ¼ ball
- Exit onto nominate heading +/-5°
- Recognise the symptoms of a spiral dive
- Recover correctly from a spiral dive
- Consider the potential threats and errors of the exercise and manage these appropriately

19.3 Application

A steep level turn is an excellent manoeuvre to develop pilot coordination and recognition of attitude. The steep level turn is typically utilised as an evasive manoeuvre.

19.4 Revision

Effect of Angle of Bank on Stall Speed

VS NEW = VS x √Load Factor

Load Factor in a turn can be calculated by:

Load Factor = 1 / COSINE (AOB)

Table 19-1 Table of Effect of Angle of Bank on Stall Speed

Angle	Load Factor	C152 Stall Speed	C172R Stall Speed	PA-28 Stall Speed
0º	1	40 KIAS	44 KIAS	50 KIAS
30º	1.15	43 KIAS	47 KIAS	53 KIAS
45º	1.41	48 KIAS	52 KIAS	59 KIAS
60º	2	57 KIAS	62 KIAS	71 KIAS

19.5 Air Exercise

Initially turns will be executed through a full 360° change in heading, and then through progressively smaller changes down to a 90° in direction.

19.5.1 Pre Manoeuvre

Prior to Referencing; ensure Aircraft is accurately trimmed for Straight and Level flight and in a stable state.

1. Select Reference point
   Reference heading
   Reference Altitude
2. Confirm Safe by Lookout (Finish lookout in the actual intended direction of turn). And check speed safe > 90 KIAS.
3. Commence Manoeuvre:
   - Entry (inputs are coordinated together): -
   - (B)ank to 45°; Passing through 30 AoB increase power to 2500RPM

Figure 19-2 Observe the Difference in Attitude due to Offset Seating Position

– (B)alance with rudder to keep the ball in the centre

Figure 19-3 Commence Manoeuvre

– (B)ackpressure to maintain altitude, increase passing 30° AOB.

4. Monitoring Scan: -

   – A Attitude - as shown on previous page (observe where the horizon intersects with the dash and canopy)
   – L Lookout - in direction of turn
   – A Attitude - Confirm attitude is maintained as shown above
   – P Performance - Artificial Horizon
     – Altitude
     – Balance/ Turn co-ordinator
     – Directional Gyro approaching reference heading

NOTE:

If errors are identified during performance scan, ensure positive correction is made with visual reference to attitude.

5. Exit Manoeuvre (Anticipate Exit ½ AOB)

   – Exit (inputs are coordinated together):
     – (B)ank - opposite to level wings
     – (B)alance - with rudder

- (B)ackpressure - relax the backpressure to return to Straight and Level Attitude Reduce power to desired straight and level cruise setting

6. Post Manoeuvre Checks

Confirm	Reference Point
	Reference Heading
	Reference Altitude

19.5.2 Key Differences in a 60 AoB Steep Level Turn

- Same procedure applies, however passing 30° AOB apply full power.
- Greater Rudder required to maintain Balance
- Greater Backpressure required to maintain Level
- Steeper AOB and difference in attitude
- Higher Load Factor

19.5.3 Spiral Dive Recognition and Recovery

- Recognition of Symptoms
  - High and Increasing AOB
  - Low Nose Attitude
  - High and Increasing IAS
  - High and Increasing ROD
  - High Noise Level

Comparison of Attitudes between a 45º Steep Level Turn and a Spiral Dive

Figure 19-4 Image 1 Normal Steep Level Turn & 2nd Image – Spiral Dive

- Recovery
  - Power to Idle
  - Roll Wing Level
  - Ease aircraft out of dive to climb attitude
  - As nose passes through horizon and airspeed at 90 KIAS smoothly apply full power to climb back to reference altitude and heading.

Table 19-2 Threat and Error Management

Threat and Error	Management
Stall	Minimum Entry Speed 90 KIAS
Pilot Flying	I have Control/You have Control Procedure
Engine	Smooth Handling of Throttle Check Oil Temps and Pressures before commencement of manoeuvre
Spiral Dive	Early Recognition of Symptoms When easing out of dive be ensure wings level prior to raising nose to prevent uneven wing loading
Traffic	Execute a thorough lookout

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20 Steep Descending Turns

20.1 Aim

To execute a steep turn in the glide at a safe speed whilst maintaining an acceptable rate of and descent and remaining in balance.

20.2 Objective

- Recognise and Maintain the steep descending turn attitude
- Correctly configure the aircraft for the manoeuvre
- Maintain Angle of Bank of 45 to within +/- 5
- Maintain 80 KIAS in the descending turn to within +/- 5 KIAS
- Maintain a steady, constant Rate of Descent to +/- 150 fpm
- Maintain Balance ¼ ball
- Recognise the symptoms of and prevent entry into a spiral dive
- If inadvertently entered, recover from a spiral dive
- Consider the potential threats and errors of the exercise and manage these appropriately

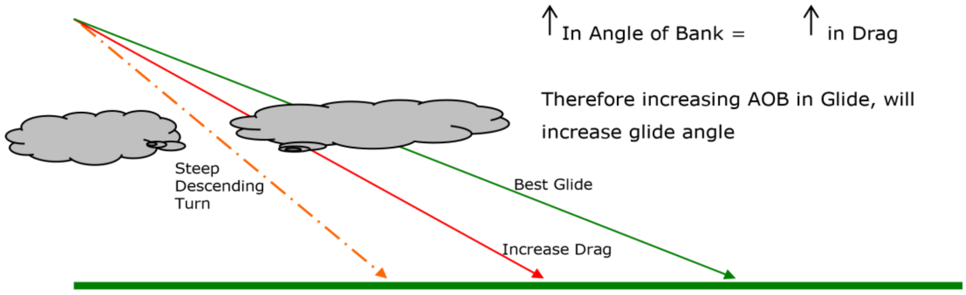
20.3 Application

A Steep Descending turn is an important manoeuvre to master, it primarily provides the pilot with a broader skill set thus improving operational capability. If required to do so the pilot can execute a steep descending turn to manoeuvre downward within a confined space, rather than in a long straight line. An example would be if the pilot finds themself above cloud a normal descent may not be possible as VMC will be compromised, a steep descending could alternatively be utilised to successfully execute the descent and maintain VMC. Practising this manoeuvre will also further improve coordination and attitude recognition.

20.4 Revision

Effects of Drag on Glide Angle and Effect of Increasing Angle of Bank on Drag

Figure 20-1 Drag/Glide Angle – Angle of Bank/Drag



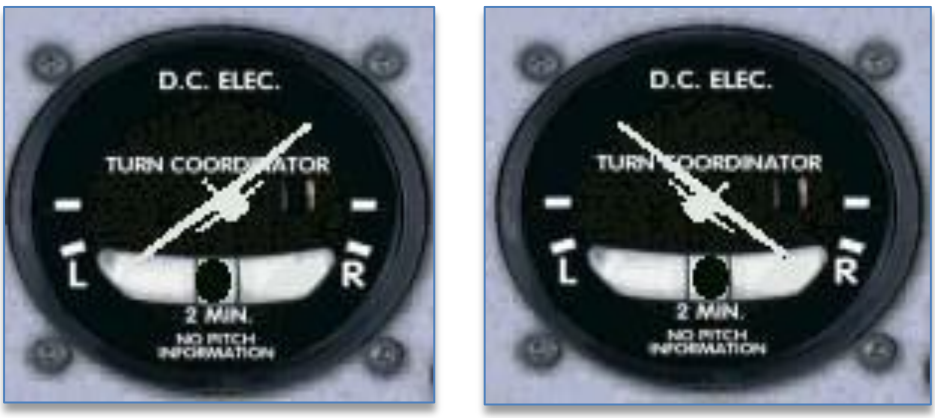
20.5 Air Exercise

20.5.1 Pre Manoeuvre

Prior to Referencing; ensure Aircraft is accurately trimmed for Straight and Level flight and in a stable state.

1. Select — Reference point
   Reference heading
   Reference Altitude
2. Confirm Safe by Lookout (Finish lookout in the actual intended direction of turn and below).
3. Commence Manoeuvre:
   - Establish aircraft in 75Kts(C152), 80Kts(C172/PA28) glide descent (carby heat on for C152/PA28) ensure accurately trimmed and stable prior to entering turn.
   - Entry into turn (inputs are coordinated together): -
   - (B)ank to 45°;
   - (B)alance with rudder to keep the ball in the centre

Figure 20-2 Balance with Rudder to Keep Ball in the Centre



   - (B)ackpressure to maintain speed.

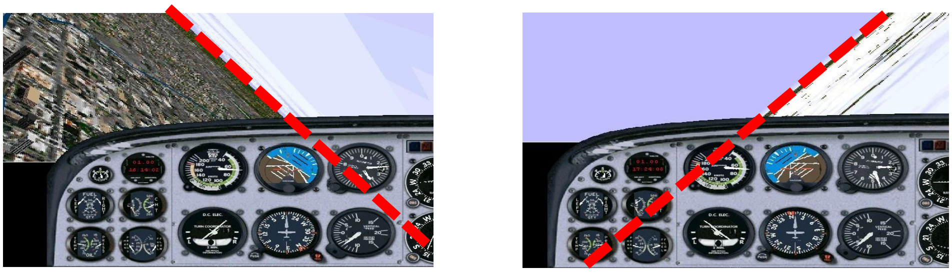
Figure 20-3 Left Steep Descending Turn

Figure 20-4 Right Steep Descending Turn

4. Monitoring Scan:

- A Attitude - Observe where the horizon intersects with the dash and canopy

Figure 20-5 Observe where Horizon Intersects with Dash & Canopy



- L Lookout - in direction of turn
- A Attitude - Confirm attitude is maintained as shown above correct for errors
- P Performance - Artificial Horizon
  - Altitude
  - Balance/ Turn co-ordinator
  - Directional Gyro approaching reference heading

NOTE:

If errors are identified during performance scan, ensure positive correction is made with visual reference to attitude.

5. Exit Manoeuvre (Anticipate Exit ½ AOB)
   - Exit (inputs are coordinated together): -
   - (B)ank - opposite to level wings
   - (B)alance - with rudder
   - (B)ackpressure - relax the backpressure to return to 80 KIAS glide attitude
   - Exit Glide Descent (P.A.S.T) onto reference Altitude, Anticipating by 10% ROD
6. Post Manoeuvre Checks

   Confirm — Reference Point
   Reference Heading
   Reference Altitude

Table 20-1 Threat and Error Management

Threat and Error	Management
Stall	Minimum Entry Speed 75Kts(C152),80Kts(C172/PA28)
Pilot Flying	I have Control/You have Control Procedure

Threat and Error	Management
Engine	Smooth Handling of Throttle Ensure Carburettor Heat on for PA-28 Warm engine every 1000’ of descent
Spiral Dive	Early Recognition of Symptoms When easing out of dive be ensure wings level prior to raising nose to prevent uneven wing loading
Traffic	Execute a thorough lookout

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21 Practice Forced Landings

21.1 Aim

To be able to safely control and land the aircraft into an unprepared field in the unlikely event of a complete or partial engine failure.

21.2 Objectives

Upon occurrence and throughout the entire procedure of a simulated or actual engine failure the pilot should be able to maintain control of the aircraft to the following standards:

- Glide Speed + 5 KIAS -0 KIAS.
- Accurately Trim the aircraft to maintain this speed.
- Maintain balance to ¼ ball.

In addition to the handling requirements the pilot should also be able to:

- Effectively prioritise tasks and workload that is conducive toward safe operation.
- Formulate a plan that identifies the most favourable into wind field for landing and assists in accurately judging glide distance.
- Develop a plan that is flexible in nature and can be adapted to suit conditions that effect glide distance to minimise the probability of under or over shoot of the planned landing area.
- Execute the plan in actual conditions and demonstrate control of the aircraft that identifies with the planned flight path.
- Or alternatively, during execution, make appropriate adjustments to the planned flight path to comply with glide capability.
- Execute immediate actions, trouble and bush checks with the aim to either rectifying the simulated, or actual engine failure and securing the aircraft for landing.
- Time permitting, execute the ancillary procedures such as the Mayday Call, Activation of the Transponder Code and issue a Passenger Briefing that identifies with relevance to the simulated or actual engine failure conditions.

21.3 Application

Practice Forced Landings are conducted to prepare the pilot for the unlikely event of a complete or partial engine failure. The skills learnt in the training area need to be applied to areas outside these boundaries where the height of terrain, types of surfaces that aircraft may be put down on and environmental conditions can be very different to what can normally be expected in and around the Moorabbin Training Area. Therefore it is important to keep in mind that the best plan of action is one that is well rehearsed, correctly prioritises and manages tasks and is flexible in nature to be able suit all conditions. Upon conclusion of this exercise it is vital to recognise that continued vigilance in practicing this procedure is important to provide the pilot with the best possible chance of a safe outcome should this ever occur.

21.4 Air Exercise

This lesson will be broken into three separate phases of training.

21.4.1 Phase 1

Initial Demonstration of complete procedure. Further practice of field selection and plan development, and Flying aircraft in glide that identifies with plan this without the implementation of procedures.

21.4.2 Phase 2

Field Selection and Plan, Flying aircraft in glide that identifies with plan implementing all checks and procedures.

21.4.3 Phase 3

Random Simulated Engine failures >2500' AGL implementing all checks and procedures.

This Briefing Contains the entire scope of training and all procedures relevant to the Forced Landing.

21.4.4 Simulation of Engine Failure

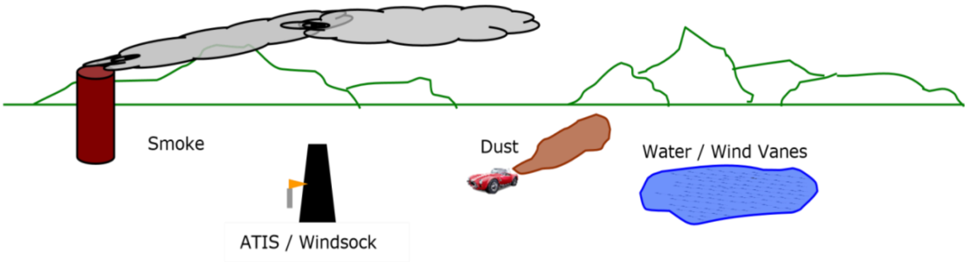
1. Set glide attitude, by lowering the nose and trim for best glide speed
2. Execute Immediate Actions: These Checks identify the most probable cause of any engine failure, therefore it has the possibility of resolving the problem right from the outset.

Table 21-1 Immediate Actions

CZ152/C172	PA-28
(C)heck For Fire (C)arby Heat On	(C)heck for Fire (C)arby Heat On
(F)uel Pump On (F)uel Quantity (F)uel Selection (F)uel Shut Off Valve In (C172)	(F)uel Pump On (F)uel Quantity (F)uel Selection
(M)ixture Rich	(M)ixture Rich
(S)witches Mags to Both	(S)witches Mags to Both

3. Determine wind direction and strength

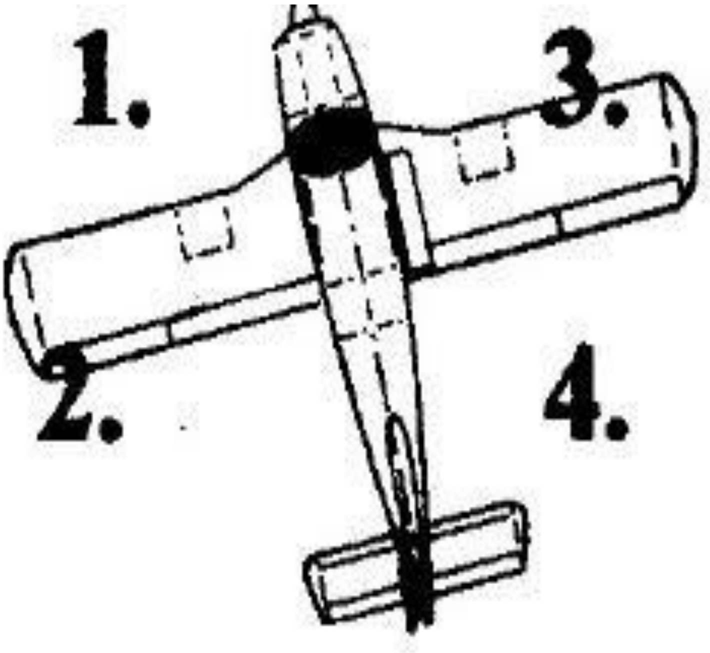
Figure 21-1 Determine Wind Direction and Strength



Other factors that will help assess wind are drift of the aircraft and the Weather Forecast.

4. Field Selection:

Figure 21-2 Field Selection

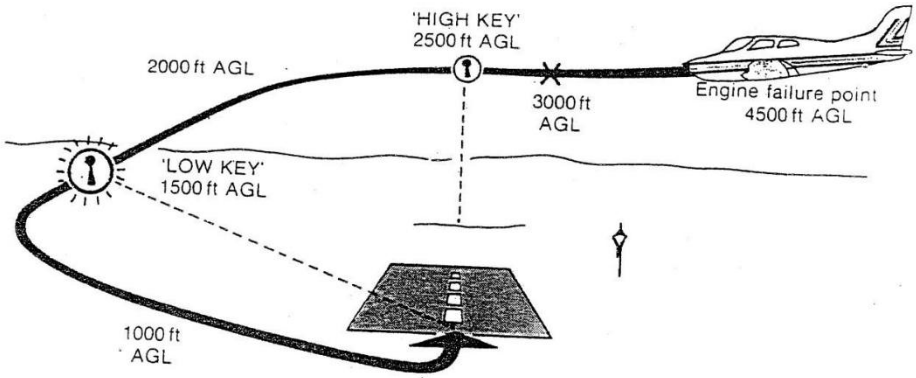


Use most favourable quadrants to begin searching for field NB: This is based on pilot sitting in front left hand seat

- Select a suitable field by identifying:
  - Size, is sufficient length for landing
  - Surface, is smooth, not wet, looks hard and no livestock
  - Shape, is square providing room for error or required change in direction in case of wind shift
  - Slope, is level or uphill
  - Surroundings, no powerlines, fences or trees that may cause obstruction on approach
  - Services, are there nearby houses available to get help once landed.

- Make Plan:
  - Orientate yourself around the field plan the high and low key points and visualise the pattern about to be flown. Ensure you plan an into wind landing.

Figure 21-3 Make a Plan



5. Execute Trouble Checks: These checks will identify the cause, or solve the problem of the engine failure, execute these with this purpose in mind and you may not have execute a forced landing. This check is primarily used for the opportunity of engine restart.
   - F – Fuel on, Fuel pump on, Change tanks
   - M – Mixture, cycle through range, Master on
   - O – Oil temps and pressures in the green
   - S – Switches, isolate each magneto
   - T – Throttle cycle through range to check linkage (for training purposes open throttle for 5 seconds to warm engine)

IF No Response - Fuel shut off valve pull out (C172)

Fuel selector off (C152/PA28)

6. Remember to continue to scan to field and assess position with reference to high and low key points to determine glide distance available, alter planned flight path if necessary.
7. Squawk Code 7700 Mode Charlie on Transponder and ELT activated (this is only simulated during training).
8. Execute Mayday Call (this is also only simulated during training):
   - "Mayday, Mayday, Mayday, ML Centre, APTA, APTA, APTA has suffered an engine failure, ______ POB (people on board), is attempting to land in a field approximately _______ (position), will attempt contact once landed."
9. Execute Passenger Brief:
   - Can I have your attention, we have suffered an engine failure, do not be concerned as I have this situation under complete control. What I need you to do is to remain calm and remove any implements you may have in your pockets, and remove your glasses from your head. Just prior to landing I will call for the

brace position, when this is called you will need to place your hands on the dash like this (if passengers are in back ask them to lean forward with their heads between their knees). After landing vacate via either the emergency or normal exits and meet me 50 metres in front of the aircraft.

10. At this stage you should be approaching the low key point, once again assess your height and determine whether or not you are low or high and if necessary adjust pattern accordingly.

11. The base turning point is determined by wind strength, but in average conditions start base turn approaching 1000' AGL. On base execute BUSH checks to secure aircraft for landing.

    – B - Brakes are off and operating
    – U - Undercarriage is down
    – S - Switches- Master and Magnetos are off

NOTE:

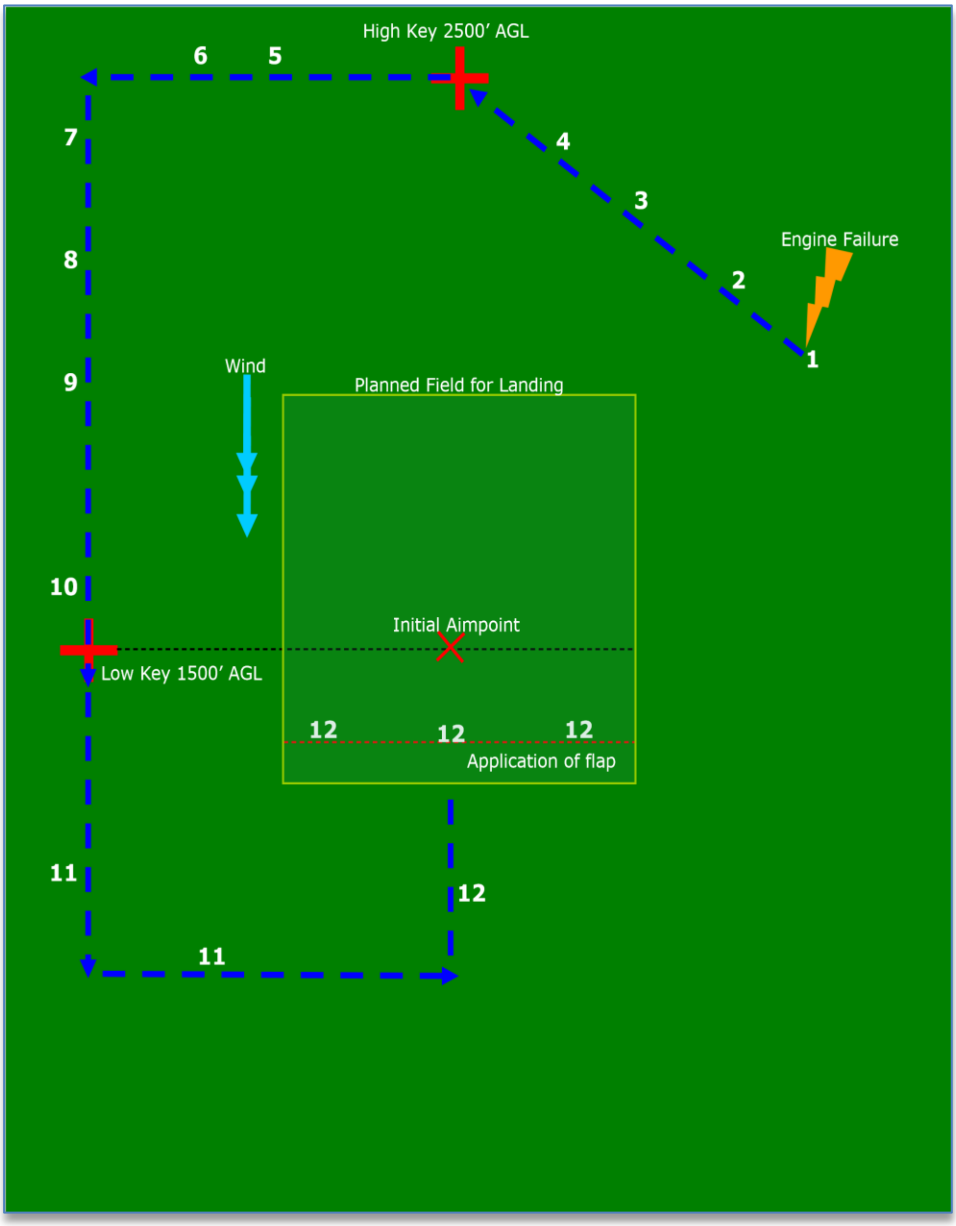
Do not turn off master in C152/C172 until you are certain there are no further requirements for flap on final.

    – H - Hatches Open and Harnesses are secure

12. For training commence go around not below 600' AGL; for actual scenario call for brace position passing 200' AGL. In actual engine failure, once certain you are going to make field use flap to move aimpoint closer to start of field assuming there are no obstructions.

21.4.5 Diagram of Planned Pattern incorporated with Forced Landing Procedures:

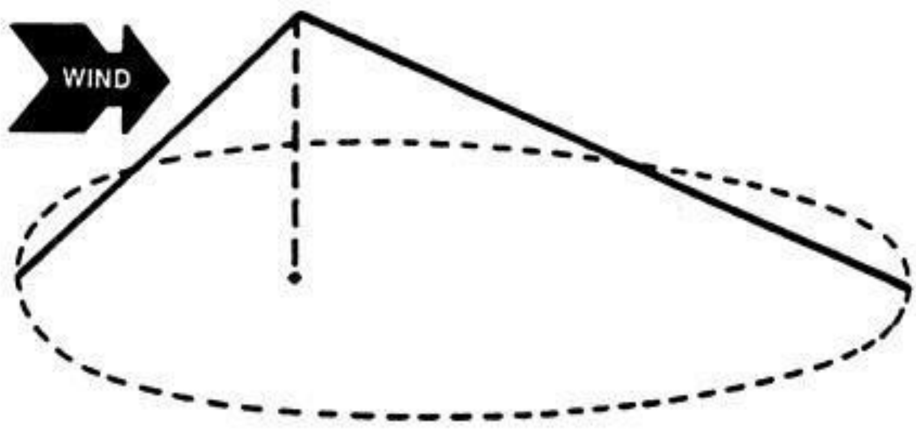
Figure 21-4 Diagram/Planned Pattern – Forced Landing Proc.



21.4.6 Considerations

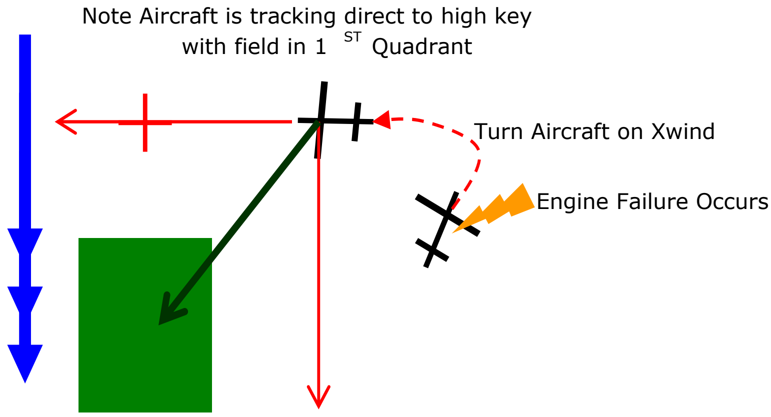
- Glide Distance Assessment:
  - This is a skill that is essential to gain an understanding of realistic selection of a field for the forced landing. There is no point selecting a field that is outside the glide capability of the aircraft. A good rule of approximation is to use the aircraft's wing span as a guide to the capable glide range. For a typical General Aviation aircraft such as the C152/C172R and PA28, in nil wind conditions the aircraft should be able to glide to a position on the ground to within ½ length of the total wingspan of the aircraft. To account for the effects of wind select a field in radius around the aircraft to within 2/3 of this reference.

Figure 21-5 Glide Distance Assessment



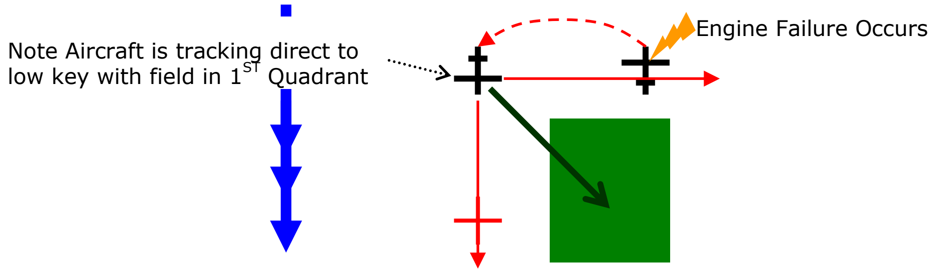
- 3000' Guide:
  - A useful guide to place the aircraft in the most optimum position for accurate field selection and to make it easier to visual a plan is to position the aircraft with reference to wind. This procedure will only work if there are an abundance of fields available for the forced landing (which is applicable to the Moorabbin Training Area).
  - When at or above 3000' turn the aircraft into a right to left crosswind, this will position the aircraft on a crosswind leg tracking direct for the high position, the field therefore will also be in the first most desirable quadrant.

Figure 21-6 3000' Guide



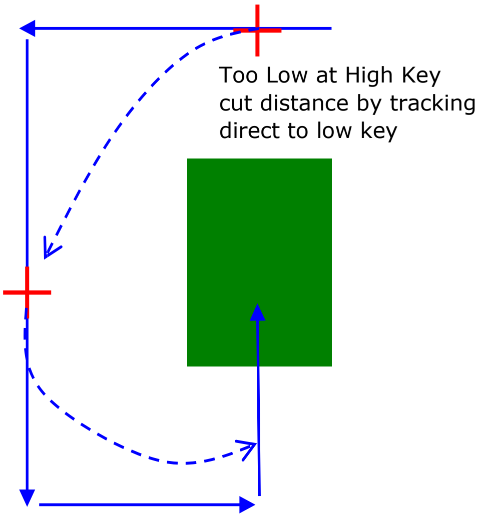
  - When below 3000' turn aircraft onto downwind, this will position aircraft tracking directly toward low key and position the field in the first most desirable quadrant.

Figure 21-7 Below 3000'



- Adapting plan:
  - You must remember that if it is apparent that you be at the desired altitude for either the low or high key points; ensure you adjust the pattern accordingly. This particularly relevant if too low.

Figure 21-8 Adapting Plan



- Task Prioritisation:
  - The two most important factors for a successful outcome on occurrence of an engine failure is that the aircraft is being flown safely and accurately and that you will be able to make a safe landing into the planned field. If other tasks are comprising these two priorities, cease the present activity and focus on flying accurately and the positioning the aircraft so that you will make the field, this ensures that you will be able to at least land and walk away. In addition to this if insufficient time is available to execute all procedures, continue with the procedure a complete as much of it as is safely possible in the order suggested. The checks and procedures are deliberately ordered in a way that prioritises the tasks from most important to least important.

NOTE:

This does not apply to BUSH checks; execute this on base leg so long as control of the aircraft and the correct profile for the approach are not compromised.

- Go Around Procedure:
  - Execute the go around as you would in the circuit at Moorabbin, however be aware that the aircraft is trimmed for the glide and a considerable amount of forward pressure will be required to maintain a safe climb attitude. As you apply power to go around allow the nose to raise to the BROC attitude and trim the aircraft before retracting flap. During flap retraction phase, confirm safe speed and a positive rate of climb prior to retracting each single stage.
- Partial or Total Engine Failure:
  - If partial power loss occurs it may be possible to still maintain altitude. Slow the aircraft to the best glide speed (no lower) and observe if maintaining height is still possible. Discuss with you instructor on strategies in the event of partial power loss where altitude can still be maintained. As the strategies applied will be determined by position in the training area.
- Remember the heights used in the Forced Landing are based on height above ground level. A good rule of thumb is adding 100' to all planned heights, as average height of terrain in the Moorabbin Training Area are about 100' AMSL.

Table 21-2 Threat and Error Management

Threat and Error	Management
Aircraft Serviceability	A thorough Daily Inspection may identify the cause of a potential engine failure
Fuel	Accurate fuel planning with the application of reserves could also prevent an engine failure Close inspection of fuel, may identify contamination and correct fuel type preventing possible engine failure
Engine	Smooth Handling of Throttle Ensure Carby Heat on for C152/PA-28 Warm engine every 1000' of descent
Traffic	Maintain a vigilant lookout throughout procedure
FN5, Built Up Areas	Do not conduct simulated engine failures above built areas and near FN5 as identified on VTC
Side Slipping	No Side Slipping with flap extended in C172

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22 Crosswind Take-Off and Landing

22.1 Aim

To be able to safely apply the correct techniques in cross wind conditions during take off, in the circuit and on landing.

22.2 Objectives

In minimum crosswind of 12kts and up to the aircraft's maximum demonstrated component, (12Kts for C152, 15kts for C172 and 17kts for PA28) the pilot should be able to maintain the following standards:

- During Take Off
  - Correctly apply aileron into wind up to the point of rotation
  - Maintain centreline within +/-2m through effective use of rudder steering
  - At rotation safely control the aircraft to accelerate toward climb speed
- On Upwind
  - Apply an accurate drift angle to maintain upwind track
  - Maintain Climb Speed +5 KIAS -0 KIAS
  - Maintain Balance ¼ ball
- On Crosswind
  - Maintain Climb Speed +5 KIAS -0 KIAS
  - Maintain Balance ¼ ball
  - Anticipate the effects of wind on Angle of Climb and Turn Radius
  - Turn onto downwind at the correct position with reference to the runway
- On Downwind
  - Apply the required drift angle to maintain downwind track
  - Anticipate the effects of wind on the radius of turn onto base
- On Base
  - Appropriately apply adjustments in power and attitude to maintain the correct profile on the base leg this compensating for the effects of wind on angle of descent.
  - Anticipate the effects of wind on the radius of turn onto final.
- On Final
  - Accurately apply the required drift angle to maintain final track
  - Maintain Speed on final +5 KIAS -0 KIAS
- During Landing
  - Be at VREF +5 to - 0 KIAS

- Safely land the aircraft applying the correct coordination of controls, using rudder to straighten the nose and aileron to maintain centreline.
- Land on centreline within +/-2m

22.3 Application

Runways are not conveniently always directly into wind, due to environmental factors the pilot will regularly be exposed to cross wind conditions. Therefore it is vitally important that a competent and consistent standard is demonstrated when conducting crosswind circuits, and that the pilot feels comfortable operating in such conditions. This exercise will also improve coordination of aircraft control and recognition of required drift angles to maintain desired tracks.

22.4 Revision

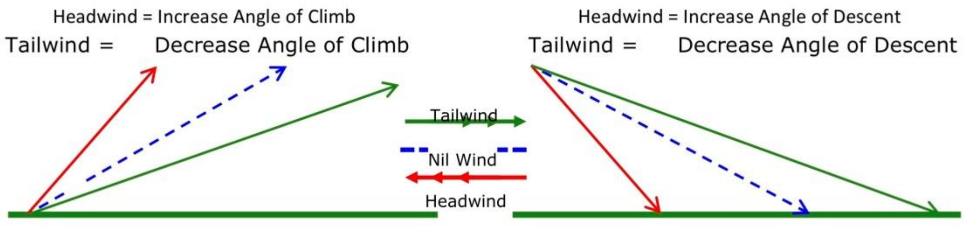
- Calculation of Crosswind Component (ERSA Extract GEN-CON-6):

Table 22-1 Wind Component Table

		For Cross Wind Component: Angle Between Wind Direction and Runway Heading								
		10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**
W	5	1	2	2	3	4	4	4	5	5
I	10	2	3	5	6	7	8	9	9	10
N	15	3	5	7	9	11	13	14	14	15
D	20	3	7	10	13	15	17	18	19	20
-	25	4	8	12	16	19	22	23	24	25
S	30	5	10	15	19	23	26	28	29	30
P	35	6	12	17	22	26	30	32	34	35
E	40	7	14	20	25	30	35	37	39	40
E	45	8	15	22	29	34	39	42	44	45
D	50	9	17	25	32	38	43	47	49	50
-	55	10	19	27	35	42	48	52	54	55
K	60	10	20	30	38	46	52	56	59	60
N	65	11	22	32	42	50	56	61	64	65
O	70	12	24	35	45	54	60	66	69	70
T	75	13	26	37	48	57	64	70	73	75
S	80	14	27	40	51	60	69	75	78	80
		80	70	60	50	40	30	20	10	0
For Head Wind Component: Angle Between Wind Direction and Runway Heading										

- Effect of Wind on Climb and Descent Angle:

Figure 22-1 Headwind Diagrams



22.5 Air Exercise

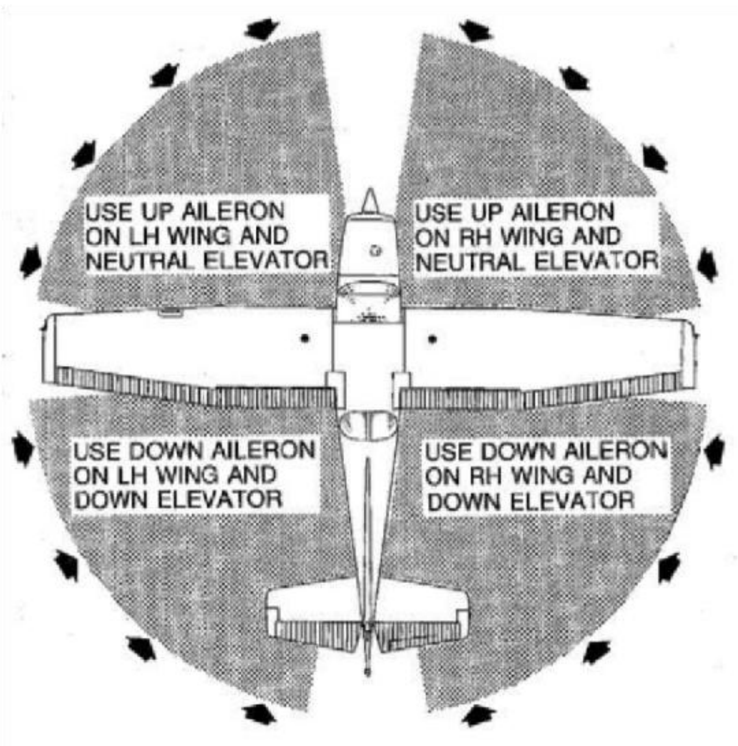
22.5.1 Desirable conditions for first lesson on Crosswind Circuits

Crosswind: Minimum 12kts and up to the Maximum Demonstrated Component.

Runway: Dry

1. Taxi: Normally at Moorabbin where there is crosswind at or above 12kts wind strength will typically be at or above 20kts, therefore it is important to use ailerons to help keep the aircraft on the ground during taxi and to reduce the chance of the controls being bashed around by wind. The recommended use of ailerons during taxi in these types of conditions are commonly identified in the Pilots Operating Handbook. Refer to extract from C152 POH page 4-12, C172R POH page 4-22: The PA28 does not reference aileron use to compensate for the effects of wind during taxi.This is because it is of low wing design and on the ground it isn't affected as greatly by wind as the C152/C172. Despite this fact, APTA recommends that the same technique is still applied during taxi for the PA28.

Figure 22-2 Use of Ailerons



2. Line Up: Observe the direction the wind is coming from and roll the ailerons with deflection into wind.

3. During the Take off Roll the Aircraft exhibits the following tendencies.

   - Roll - due to dihedral - overcome by use of aileron "into wind". As the aircraft accelerates toward rotation speed; gradually reduce the deflection of aileron so that at the point of rotation ailerons are neutral.
   - Drift - Due to wind on side surfaces - use slight forward elevator pressure to maintain firm wheel pressure on the ground. This up to the point of rotation.
   - Yaw - "Weathercock" effect - keep straight with rudder. Be aware of the tendency of the aircraft to want to "Weathercock", as a

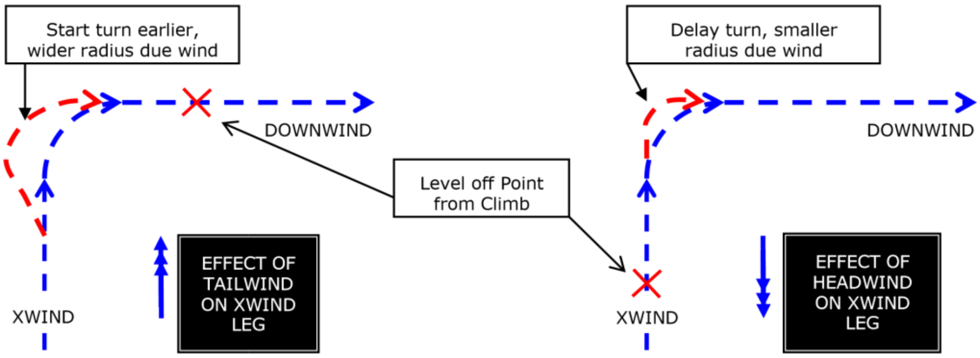
result positive rudder control will be required throughout the entire takeoff roll to ensure you remain on centreline.

4. Rotation: As the aircraft rotates the undercarriage is no longer in contact with the runway, the aircraft will want to weathercock into wind, keep wings level allow this to occur, confirm that the resulting drift angle applied is keeping the aircraft on track for upwind. Take note of the heading and maintain this for the remainder of the upwind leg.

5. Upwind: Confirm Upwind Track, Maintaining Required Speed, apply all normal circuit procedures, lookout and commence turn onto crosswind.

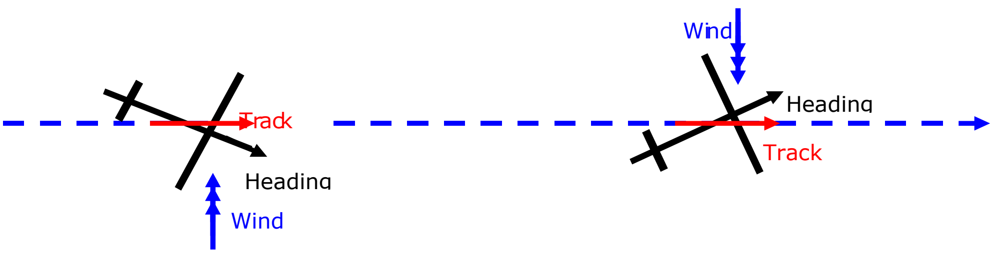
6. Crosswind: The crosswind leg will now be predominately either a head or tailwind, this will affect the point at which level off at 1000'AGL occurs. Also anticipate for the effects of wind on climb angle and turn radius onto downwind.

Figure 22-3 Turns in Crosswind



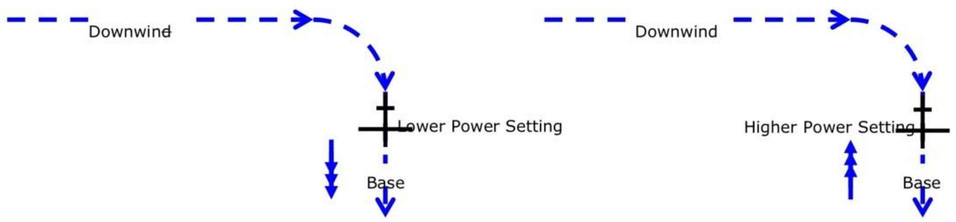
7. Downwind: Heading held will need to compensate for crosswind, therefore resist the temptation of using the normal visual que for maintaining a heading that parallels the runway, otherwise an incorrect track will be held. Track must parallel runway direction.

Figure 22-4 Effect of Wind



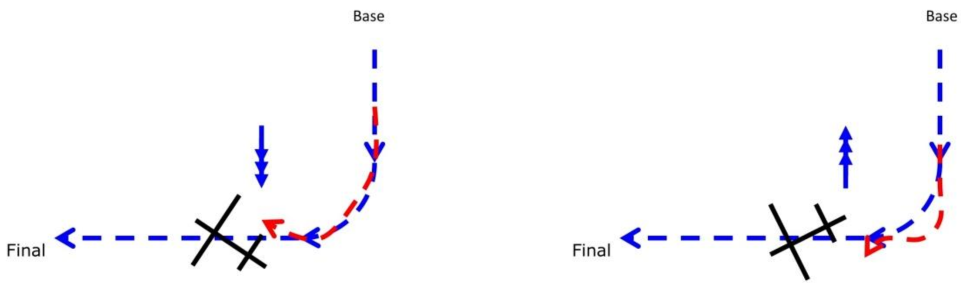
8. Base: Prepare early for the effects of wind on this leg. The way the aircraft will be configured for the approach with reference to power setting is primarily determined by the direction and strength of wind in the circuit. A tailwind on the base leg, will indicate the need for a lower than normal power setting to retain the standard base profile. A headwind will indicate the need for a higher than normal power setting to achieve the same standard base profile. Check heights are important, ensure mid base the aircraft is 800'.

Figure 22-5 Downwind



9. Turn: Judging the turn onto final will again be determined by the direction and strength of wind, anticipation of these conditions and their effects on the aircraft needs to be considered to ensure the aircraft is established on final approach path early, and the focus can be maintained on the approach, rather than be obligated to correct for errors that have occurred in the turn. Roll out onto final, pre empting the effects of drift, by turning a little further, into wind.

Figure 22-6 Base



Commence turn earlier and continue to roll a little further to Delay turn and roll out earlier to position nose position nose a little left of centerline to anticipate for drift slightly right of centerline to anticipate for drift.

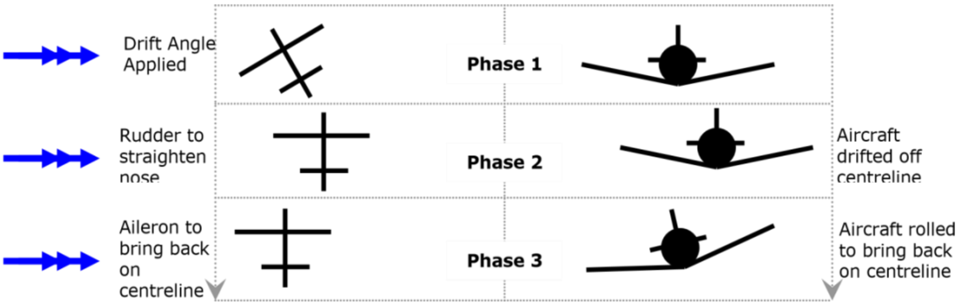
10. Final: Execute A.C.A scan whilst compensating for crosswind.

    – (A)impoint: Set spacing from dash as normal however the position, left or right in the windscreen will be different due to drift application on final. Adjust with elevator if required. Refer to diagram above.
    – (C)entreline: Control with aileron, if centreline is off position roll in toward the desired direction to re-intercept.
    – (A)irspeed: Maintain with power.

11. Landing: This phase of the circuit will require some coordination of control input to ensure the aircraft is landed straight and on centreline. o Commence transition from approach to landing at normal height.

    – Use Rudder to straighten Nose
    – Observe Drift, then use aileron to bring aircraft back onto centreline and maintain.
    – As aircraft continues to slow during landing, be aware control effectiveness will also reduce therefore greater control input required to keep nose straight and remain over centreline.

Figure 22-7 Landing



12. Touch Down: Correctly landed the aircraft's into wind main wheel will touch down first, then the opposite main and finally the nose wheel. Once all three wheels are on the ground roll ailerons completely into wind, and either bring aircraft to a safe exit speed to taxi off runway or for touch and go recommence the crosswind take off procedure.

Table 22-2 Threat and Error Management

Threat and Error	Management
Max Demonstrated X-wind Component	Do not attempt to land aircraft in conditions that exceed this figure
Weather	Read Forecast and ascertain before departure that conditions will not deteriorate so that wind does not exceed manufacturer's recommended limitations Listen to ATIS
Traffic	Do not attempt Crosswind Circuits on non duty runway where there is high traffic density, maintain a vigilant lookout
Aircraft Serviceability	Thorough Daily Inspection Maintenance Release
Pilot Flying	"I have Control" "You Have Control" Procedure Clear Communication
Unstable Approach	Go Around

Intentionally Blank

23 Shortfield Take-Off and Landing

Figure 23-1 Shortfield Take-Off and Landing

23.1 Aim

To be able to determine the requirement to execute a short field take off or landing using performance charts measured against available runway and carry out the manoeuvre and relevant procedures safely whilst using the minimum runway possible.

23.2 Objectives

- Calculate Take Off and Landing Distance pre flight using actual conditions.
- Develop awareness of and recognise typical conditions and available runway lengths that facilitate the need to execute a short field take or landing.
- Execute a short field take off using as minimum runway as possible.
- Safely climb the aircraft to an altitude of at least 200 feet AGL or until obstacles are cleared at the recommended climb speed to +5 KIAS – 0 KIAS, and thereafter at BROC at +/- 5KIAS.
- Execute a short field landing using as little runway as possible.
- Accurately Hold an Aimpoint and planned touchdown point
- Maintain Approach speed to +/-5 KIAS
- Apply maximum effective braking on landing without wheel skid to bring the aircraft to a complete stop in the minimum possible distance

23.3 Application

In order to take-off and land on a strip where the runway length available and or obstacle clearance gradients are only just sufficient to satisfy take-off and landing requirements it is necessary to modify our take-off and landing techniques.

23.4 Revision

Calculation of Take off and Landing Distance Required under the following conditions:

Table 23-1 Calculation of Take-Off and Landing Distance Required

Item	Amount	Item	Amount
Headwind	12 kts	Temperature	24º C
Weight	MTOW	Pressure	1002 HPA
		Field Elevation	460’

Performance charts for C152, Short Field Take Off:

Figure 23-2 Performance Charts for C152 – Short Field T/O (1)

CESSNA
MODEL 152

SECTION 5
PERFORMANCE

TAKEOFF DISTANCE

SHORT FIELD

CONDITIONS:
Flaps 10°
Full Throttle Prior to Brake Release
Paved, Level, Dry Runway
Zero Wind

NOTES:
1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.

WEIGHT LBS	TAKEOFF SPEED KIAS		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
1670	50	54	S.L.	640	1190	695	1290	755	1390	810	1495	875	1605
			1000	705	1310	765	1420	825	1530	890	1645	960	1770
			2000	775	1445	840	1565	910	1690	980	1820	1055	1960
			3000	855	1600	925	1730	1000	1870	1080	2020	1165	2185
			4000	940	1775	1020	1920	1100	2080	1190	2250	1285	2440
			5000	1040	1970	1125	2140	1215	2320	1315	2525	1420	2750
			6000	1145	2200	1245	2395	1345	2610	1455	2855	1570	3125
			7000	1270	2470	1375	2705	1490	2960	1615	3255	1745	3590
			8000	1405	2800	1525	3060	1655	3395	1795	3765	1940	4195

Figure 5-4. Takeoff Distance

1 July 1979

5-11

For Flight Training Reference Only

Figure 23-3 Performance Charts for C152 – Short Field T/O (2)

CESSNA
MODEL 152

SECTION 5
PERFORMANCE

TAKEOFF DISTANCE

SHORT FIELD

CONDITIONS:
Flaps 10°
Full Throttle Prior to Brake Release
Paved, Level, Dry Runway
Zero Wind

NOTES:
1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.

WEIGHT LBS	TAKEOFF SPEED KIAS		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
1670	50	54	S.L.	640	1190	695	1290	755	1390	810	1495	875	1605
			1000	705	1310	765	1420	825	1530	890	1645	960	1770
			2000	775	1445	840	1565	910	1690	980	1820	1055	1960
			3000	855	1600	925	1730	1000	1870	1080	2020	1165	2185
			4000	940	1775	1020	1920	1100	2080	1190	2250	1285	2440
			5000	1040	1970	1125	2140	1215	2320	1315	2525	1420	2750
			6000	1145	2200	1245	2395	1345	2610	1455	2855	1570	3125
			7000	1270	2470	1375	2705	1490	2960	1615	3255	1745	3590
			8000	1405	2800	1525	3080	1655	3395	1795	3765	1940	4195

Figure 5-4. Takeoff Distance

1 July 1979

5-11

For Flight Training Reference Only

Figure 23-4 Performance Charts for C152 – Short Field Landing

SECTION 5
PERFORMANCE

CESSNA
MODEL 152

LANDING DISTANCE

SHORT FIELD

CONDITIONS:
Flaps 30°
Power Off
Maximum Braking
Paved, Level, Dry Runway
Zero Wind

NOTES:
1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 45% of the "ground roll" figure.
4. If a landing with flaps up is necessary, increase the approach speed by 7 KIAS and allow for 35% longer distances.

WEIGHT LBS	SPEED AT 50 FT KIAS	PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
			GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS
1670	54	S.L.	450	1160	465	1185	485	1215	500	1240	515	1265
		1000	465	1185	485	1215	500	1240	520	1270	535	1295
		2000	485	1215	500	1240	520	1270	535	1300	555	1330
		3000	500	1240	520	1275	540	1305	560	1335	575	1360
		4000	520	1275	540	1305	560	1335	580	1370	600	1400
		5000	540	1305	560	1335	580	1370	600	1400	620	1435
		6000	560	1340	580	1370	605	1410	625	1440	645	1475
		7000	585	1375	605	1410	625	1440	650	1480	670	1515
		8000	605	1410	630	1450	650	1480	675	1520	695	1555

Figure 5-11. Landing Distance

5-19(5-20 BLANK)

For Flight Training Reference Only

Figure 23-5 Performance Charts for C172 Short Field T/O (1)

SHORT FIELD TAKEOFF DISTANCE
AT 2450 POUNDS

CONDITIONS:

Flaps 10°
Full Throttle Prior to Brake Release
Paved, level, dry runway
Zero Wind
Lift Off: 51 KIAS
Speed at 50 Ft: 57 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	845	1510	910	1625	980	1745	1055	1875	1135	2015
1000	925	1660	1000	1790	1075	1925	1160	2070	1245	2220
2000	1015	1830	1095	1970	1185	2125	1275	2290	1365	2455
3000	1115	2020	1205	2185	1305	2360	1400	2540	1505	2730
4000	1230	2245	1330	2430	1435	2630	1545	2830	1655	3045
5000	1355	2500	1470	2715	1585	2945	1705	3175	1830	3430
6000	1500	2805	1625	3060	1750	3315	1880	3590	2020	3895
7000	1660	3170	1795	3470	1935	3770	2085	4105	2240	4485
8000	1840	3620	1995	3975	2150	4345	2315	4775	---	---

NOTES:

1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.
5. Where distance value has been deleted, climb performance is minimal.

Figure 5-5. Short Field Takeoff Distance

Figure 23-6 Performance Charts for C172 Short Field T/O (2)

SHORT FIELD LANDING DISTANCE AT 2450 POUNDS

CONDITIONS:

Flaps 30°
Power Off
Maximum Braking
Paved, level, dry runway
Zero Wind
Speed at 50 Ft: 62 KIAS

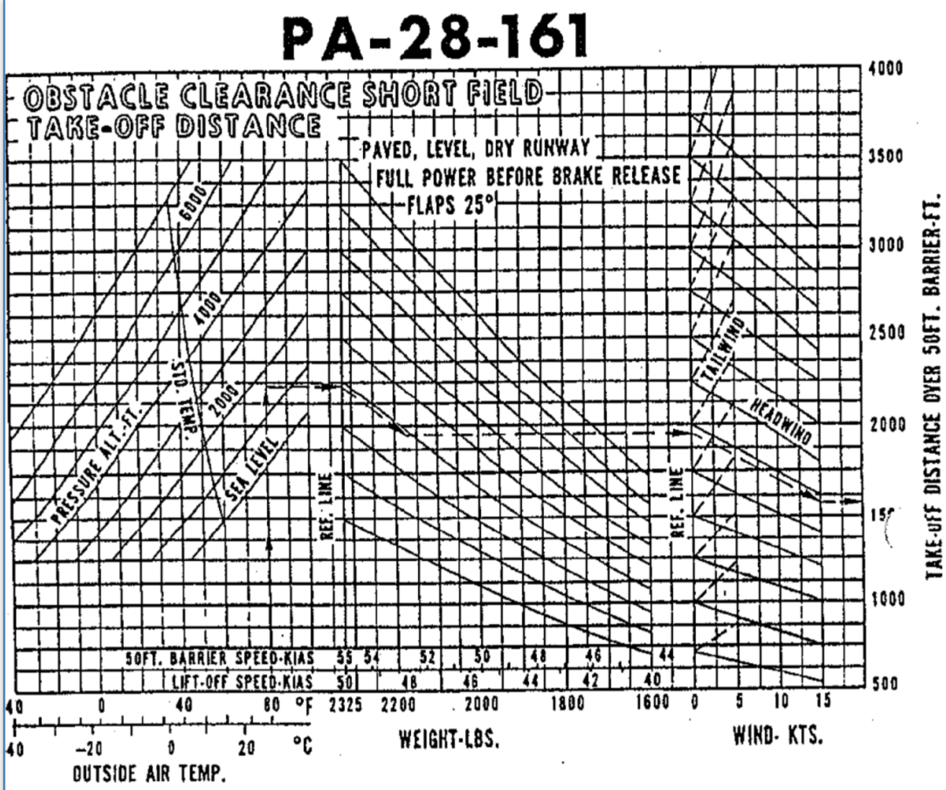
Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	525	1250	540	1280	560	1310	580	1340	600	1370
1000	545	1280	560	1310	580	1345	600	1375	620	1405
2000	565	1310	585	1345	605	1375	625	1410	645	1440
3000	585	1345	605	1380	625	1415	650	1445	670	1480
4000	605	1380	630	1415	650	1450	670	1485	695	1520
5000	630	1415	650	1455	675	1490	700	1525	720	1560
6000	655	1455	675	1490	700	1530	725	1565	750	1605
7000	680	1495	705	1535	730	1570	755	1610	775	1650
8000	705	1535	730	1575	755	1615	780	1655	810	1695

NOTES:

1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on dry, grass runway, increase distances by 45% of the "ground roll" figure.
4. If landing with flaps up, increase the approach speed by 7 KIAS and allow for 35% longer distances.

Figure 5-11. Short Field Landing Distance

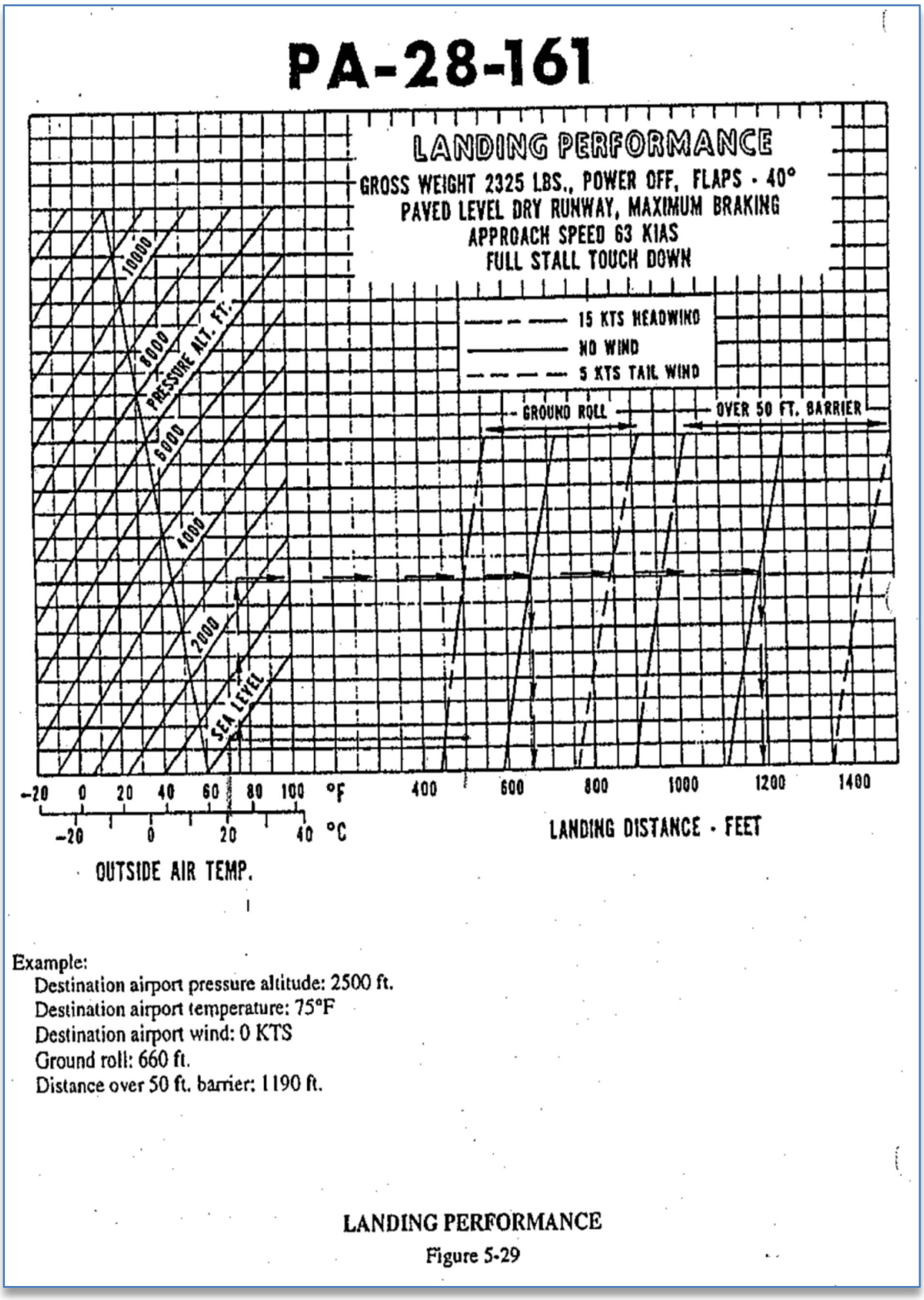
Figure 23-7 Performance Charts for PA-28 – Short Field T/O



Example:
Departure airport pressure altitude: 1500 ft.
Departure airport temperature: 80°F
Weight: 2175 lbs.
Wind: 15 KTS headwind
Distance over 50 ft. barrier: 1600 ft.
Lift-off speed: 48 KIAS
Barrier speed: 53 KIAS

OBSTACLE CLEARANCE SHORT FIELD TAKEOFF DISTANCE
Figure 5-8

Figure 23-8 Performance Charts for PA-28 – Short Field Landing



23.5 Air Exercise

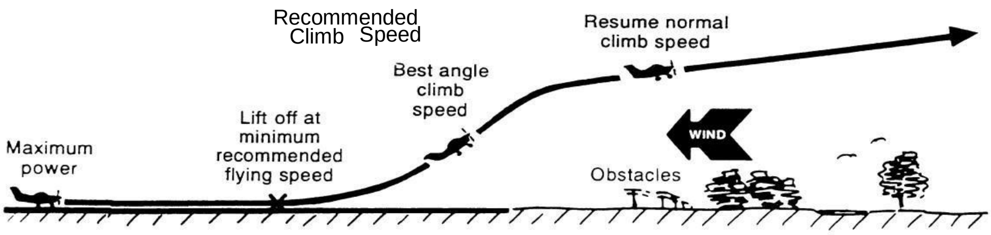
1. Pre Flight Calculation of Take off and Landing Distance.
2. Run-Up Bay: Amend Take-Off Safety Brief to identify short field take off procedures.
3. Line Up:

- Pre Line Up at Holding Point; configure aircraft for Short Field Take Off as stipulated in POH. C152: Flaps 10° C172: Flaps 10 PA28: Flaps 25
- Line Up, positioning the aircraft to leave as much runway (Take-Off Distance Available) ahead as possible.

4. Take Off:

   - Apply Maximum Braking
   - Gradually Apply Full Power, do not allow aircraft to roll forward.
   - Check Minimum Static RPM. C152: 2280RPM C172R: 2065RPM PA28: 2330RPM
   - Check Oil Temperatures and Pressures within Limits
   - Release Brakes
   - Allow aircraft to roll forward maintaining centreline with rudder.
   - Rotate at C152: 50 Kts C172R: 55 Kts PA28: 50 Kts

Figure 23-9 Recommended Climb Speed



5. Climb

   - Maintain Recommended Climb Speeds with Flaps extended up to 200’ or until clear of obstacles, whichever is the greater. Recommended POH Speeds; C152 54 KIAS, C172R 57 KIAS, PA28 63 KIAS.
   - Once above 200’ or clear of obstacles, start to retract flaps and accelerate to BROC. Retract flaps by stage firstly confirming a positive ROC and a safe speed. Safe speed to flap retraction for C152 60 KIAS, C172R 60 KIAS and for PA28 65 KIAS.

6. Crosswind, Downwind, Base: Executed as normal circuit.

7. Final: The final approach is where a few adjustments will need to be made to enable the minimum possible landing distance required. Key factors in ensuring that this can be achieved are as follows:

   - Flap (full)
   - Lower stall speed (C152 – 35kts, C172R - 33kts, PA28 – 44kts).
   - Lower target threshold speed (Vat for C152 55Kts, C172R 62Kts, PA28 63Kts).
     - Having a lower Vat will also reduce the time in flare and allow for a slower touchdown speed therefore a shorter ground run is achievable.
   - Power

  - Powered approach desired for more effective rudder and elevator control.
  - Controls Airspeed
  - Don't reduce power excessively, otherwise a high sink rate may develop and a heavy touchdown may result (at low speed the aeroplane has less effective controls and a reduced flaring capability).
- Approach Profile
  - Normal till short final (300').
  - On the latter part of the approach the speed should be reduced to Vat and careful use of power to maintain this airspeed is necessary
  - Aimpoint is slightly lower in windscreen, compared with a normal approach and is kept constant with elevator.
  - Use power to adjust IAS as required and elevator to maintain aimpoint.

8. Touchdown and Landing Roll: As aircraft touches down onto runway and all three wheels are in contact with the surface, ensure you begin to apply maximum effective braking to bring aircraft to a complete stop. This is achieved by the application of two controls, application of main wheel brakes with increasing pressure as speed is reducing where maximum braking is applied close to full stop, this coordinated with the gradual application of backpressure on the control column, bringing the control column to full aft position before the aircraft has stopped rolling. Doing this will provide maximum effective wheel braking and maximum effective aerodynamic braking.

Figure 23-10 Threat and Error Management

Threat and Error	Management
Turbulence	Induces undesired aircraft state, increase approach speed by 5KIAS
Unstable Approach	Go Around
EFATO	Ensure positive action is taken to lower nose to glide speed, particularly below 200’
Engine	Smooth application of power during take-off phase
Slow Approach Speeds (Stall)	Pay attention to airspeed on approach, manage with application of power if required
Damp or Wet Runway	Will increase landing distance required, consider the conditions and the impact it will have on landing distance
Traffic	If practicing at YMMB, be aware that the length of the upwind leg is reduced, therefore normal traffic sequencing is compromised, maintain a vigilant lookout at all times

Threat and Error	Management
Pilot Flying	“I have Control” “You Have Control” Procedure
Gravel Surface	Ensure aircraft is not over gravel surface when full power is applied for the take off roll, if unavoidable consider the possibility of configuring aircraft for short field take off but rolling forward as power is applied
Aircraft Serviceability	Daily Inspection, check for damage to propeller, normally shortfield landings and take offs are executed at country strips that are unsealed, there gravel may have caused damage to propeller
Unstable Approach	Go Around

24 Flapless Landing

24.1 Aim

To be able to execute a circuit and landing safely without the use of flap on the approach.

24.2 Objectives

- Recognise the difference of reference in the aimpoint held in the windscreen as viewed by the pilot.
- Maintain a standard circuit pattern, whilst making the appropriate adjustments on base and final with power and attitude to hold a standard approach profile.
- Effectively control and maintain required airspeeds during the approach phase with use of power to +/- 5KIAS
- Obtain Vat to within +/-5KIAS
- Identify the extended length of the flare during landing and effectively control the aircraft without ballooning during hold off.
- Safely and consistently land the aircraft without the use of flap.

24.3 Application

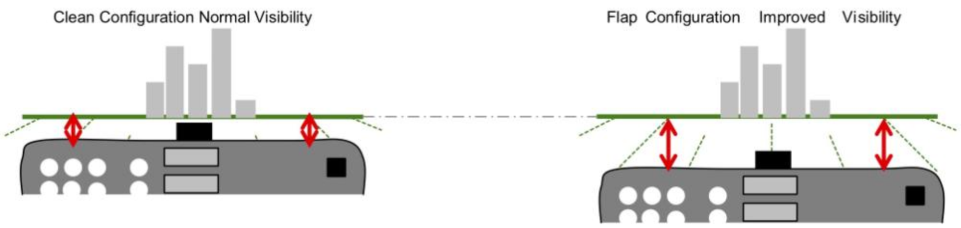
A Flapless approach may be necessary for a number of reasons, primarily and most obviously a failure due to electrical, hydraulic or mechanical failure will necessitate the need to execute one, in addition to this not all Aircraft not fitted with flaps therefore the skills learnt in this exercise can be transferred across to other aircraft. A flapless approach could also be of use in turbulent conditions, due to the higher approach speeds required on base and final it allows for greater control effectiveness therefore providing greater ability to manage undesired aircraft states induced by gusty or unfavourable weather conditions.

24.4 Revision

24.4.1 The effects of application of Flap

- Improved Forward Visibility for same airspeed i.e. a lower nose attitude when compared to maintaining same speed in clean configuration
- Reduced Lateral Stability due to greater lift being produced on inboard sections of wing.
- Reduced Stall Speed, allowing slower speed flight.

Figure 24-1 Effects of Application of Flap



24.5 Air Exercise

Standard Circuit procedures apply up to the point on downwind where the aircraft is abeam the landing threshold.

1. Abeam Landing Threshold:
   - C152: Carburettor Heat On and maintain Normal Straight and Level power setting.
   - C172: Once past landing threshold and approach base turning point begin to reduce power to 1500 RPM
   - PA28: Carburettor Heat On and maintain Normal Straight and Level power setting.
2. Base: Correctly Configured there should be no need to extend the downwind leg, use a level turn at reduced power to bring aircraft to the desired early base speed.
   - C152: During or just prior to level turn onto base reduce power to 1500RPM. Once rolled out on leg, continue to hold straight and level until at 75 Kts, then set attitude with elevator to maintain this speed.
   - C172: Execute medium level turn onto base, when rolled out onto base leg continue to hold straight and level until at 85 Kts, then set attitude with elevator to maintain this speed.
   - PA28: During or just prior to level turn onto base reduce power to 1700RPM. Once rolled out on leg, continue to hold straight and level until at 85 Kts, then set attitude with elevator to maintain this speed.

NOTE:

A higher than normal attitude will be required to maintain this speed on base, due no flap.

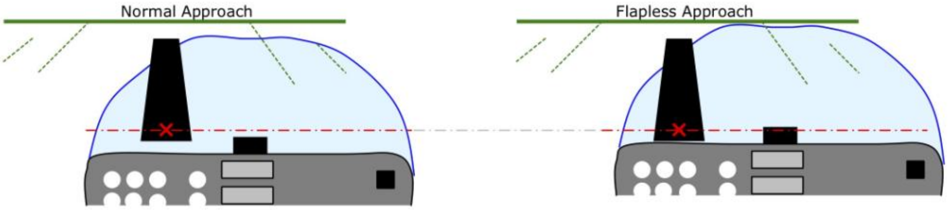
   - Accurately trim aircraft to relieve any control column pressure.
   - Carefully use power to adjust rate of descent.
   - Mid Base; Check and confirm height and slow aircraft to 80Kts(C172 & PA28) using attitude or elevator control. If high or low adjust rate of descent accordingly with power.

- Commence lookout for turn onto final, compensate for slightly faster approach speed therefore turn will need to be made a little earlier.
- Commence turn onto final, use turn to reduce speed to 70Kts(C152), 75Kts(C172 and PA28).

3. Final:

   - Set and Hold Aimpoint with Elevator. Observe difference in position of aimpoint in windscreen, still planning to touchdown on same position on runway as normal approach.

Figure 24-2 Normal and Flapless Approach



NOTE:

Position on runway hasn't change but the position in the windscreen has! You are still planning to touchdown at the same point, your aimpoint on the runway has not moved it's the visual cue that has!

   - Mid Final continue to slow airspeed to 65Kts(C152), 70Kts (C172,PA28), control this change with careful alterations in power, small increases in power will result in large increases in speed. When changing power allow some time for the aircraft to react to your control input and observe the change over time to prevent "chasing" an airspeed on the final leg.
   - A stable approach is important, below 300' if speed is +/-10KIAS do not attempt to stabilise execute a go around.

4. Landing o On transition from approach to landing, raise the nose to straight and level and hold off. The aircraft will take significantly longer to slow down, therefore careful application of backpressure during the hold phase is required to prevent ballooning. Take note of the extended flare and hold off period.

Table 24-1 Threat and Error Management

Threat and Error	Management
High Nose Altitude on Approach	Thorough and Vigilant Lookout. Use radio to improve situational awareness
Unstable Approach	Too high airspeed on final could lead to excessive landing distance required, Go Around!

Threat and Error	Management
Low and Flat Approach	Standard Circuit pattern with appropriate adjustments in power and attitude should prevent this
Unstable Airspeed	Due less drag with no flap use power carefully on final to control speed
Pilot Flying	I have Control / You have Control Procedure
Flap Failure	Flapless Approach
Aircraft Serviceability	Daily Inspection Maintenance Release

25 Instrument Flying

25.1 Aim

To be able to safely fly the aircraft with sole reference to the instruments.

25.2 Objectives

- Recognise and appropriately apply key scanning techniques for manoeuvres.
- Maintain a scan during manoeuvres to minimise the possibility of instrument fixation.
- Set and hold desired aircraft attitudes to achieve desired performance profiles.
- Maintain a rate one turn to +/-5° AOB, +/-150' of altitude and in balance to ¼ ball, and exit onto a predetermined to within +/-5°.
- Maintain Straight and Level to +/-150', heading +/-5° and balance ¼ ball.
- Enter and maintain a steady state climb to within a speed of +/-10 KIAS, heading of +/-5°, in balance to ¼ ball.

Level off at a predetermined altitude to within +/-100'.

- Enter and maintain a steady state descent within speed of +/-10 KIAS, heading of +/-5°, in balance to ¼ ball.

Level off at a predetermined altitude to within +/-100'.

- Fly and safely control the aircraft with reference to the instruments on a limited panel.
- Recover safely from unusual attitudes
- Apply the relevance of this lesson to real life scenarios of inadvertent entry into IMC conditions and apply most appropriate actions to return to VMC conditions.

25.3 Application

This lesson sets a foundation for future development in skill by flying with sole reference to the instruments in the Night VFR and IFR phases of training. For this reason it is vitally important that a sound understanding and appreciation is developed in the basics of scan technique and aircraft control. It also relevant on the occurrence of inadvertent entry into IMC, the skills learnt from this lesson are provided to develop and understanding of how to correctly respond to such a scenario; through the application of appropriate action to return to VMC and minimise the possibility of potentially entering dangerous undesired aircraft states or controlled flight into terrain.

25.4 Revision

25.4.1 Rate One Turn

Holding a Rate One Turn will achieve a change in direction of 3° a second or a turn through 360° in 2 minutes. There are a number formulas available to calculate the approximate angle of required to maintain a Rate 1 Turn; two are provided below:

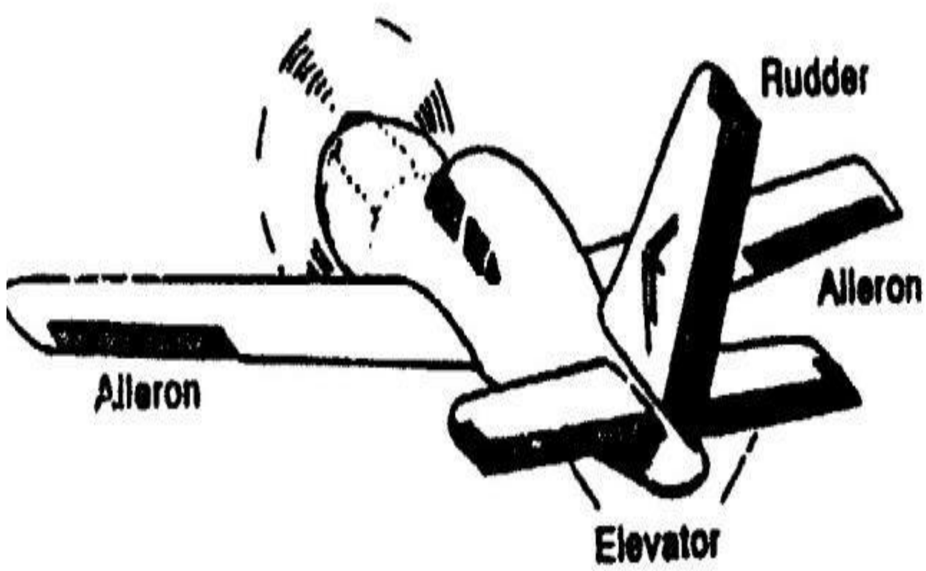
AOB for Rate 1 = IAS/10 + 7

OR

AOB for Rate 1 = IAS/10 + IAS/20

25.5 Air Exercise

Figure 25-1 Ailerons, Rudder and Elevator



25.5.1 Introduction

The visual pilot will rarely encounter situations where sole reliance on the flight instruments is required. In most situations it does occur it is usually a result of poor planing or inadequate attention to deteriorating conditions or failing light. The possibility however does exist and although only a small portion of training is allocated to instrument flight, it is important to have an understanding of the fundamentals of instrument flight.

The three fundamental skills required for instrument flight are:

- Instrument interpretation.
- Aeroplane control.
- Scan technique.

25.5.2 Instrument Interpretation

In order to achieve the desired performance for each manoeuvre it is important to be able to correctly use and interpret the flight instruments. Because power and attitude determine performance the AH and tachometer are the primary control instruments. The tachometer is easily interpreted and need only be checked occasionally. The AH however is the master instrument and it should be understood fully to enable correct and smooth manipulation of the aircraft. The AH is a representation in miniature of the aircraft attitude and therefore only requires small changes to the attitude representation. For example a change from straight and level attitude to the climb attitude may only be one ball width higher than the cruise attitude.

The two horizontal white bars represent the aircraft wings and represent wings level or a bank angle. The central white ball indicates the nose attitude of the aircraft to the horizon.

Figure 25-2 Artificial Horizon

During the turn the miniature aeroplane on the AH will remain parallel to the aircraft's lateral axis and the horizon will move to indicate the bank angle. Angles of bank should not exceed 20 degrees in normal instrument flight, this approximates a rate one turn and will limit the physiological effects of vertigo.

Figure 25-3 Turning

The turn coordinator will give information on bank, balance and rate of turn. During level flight it will show a wings level indication and provide supportive information regarding bank to that given by the AH. In a standard rate one turn it will provide the performance information to confirm the bank angle is correct.

The direction gyro (DG) when used in conjunction with the compass provides accurate heading information and is the primary instrument for providing heading information both in level flight and during the turn. It is not subject to the turning & acceleration errors of the magnetic compass.

Control of the aircraft vertically can be interpreted by the ALTIMETER, VSI, and indirectly by the ASI. The altimeter gives a direct reading of the atmospheric pressure converted to indicate the altitude of the aircraft above a preset pressure datum. It is extremely accurate however, a sudden attitude change due to an external disturbance or pilot input may be indicated more quickly by reference to the VSI. The VSI is therefore a provider of pitch information and will allow an attitude correction to be made on the AH before the ALTIMETER has hardly had a chance to register a change in height.

The airspeed indicator (ASI) will also give indirect information on pitch changes but primarily it should be used in conjunction with the AH to establish correct attitudes for climb performance. The ASI will give an accurate representation of INDICATED AIRSPEED but it must be realised that once an attitude change has been made, a few seconds will lapse before the IAS decreases.

25.5.3 Aircraft Control

During instrument flight it is important to maintain smooth coordination of power and flight controls. The AH and tachometer are the control instrument and should be used primarily when setting the aircraft in a particular configuration. The other instruments can then be cross referenced to confirm the correct performance is achieved.

Remember the AH is the PRIMARY ATTITUDE INDICATOR.

A useful rule to remember when making a change to configuration is:

CHANGE	Adopt the appropriate power setting and attitude.
CHECK	Check desired performance is being achieved.
HOLD/ ADJUST	Hold the selected attitude if correct or adjust as required.
TRIM	Trim to the desired attitude.

Finally we now need to learn the correct method of cross referencing the flight instruments.

25.5.4 Scan Technique

In visual flight the pilot relies upon aircraft attitude combined with a given power setting to give the required performance. Cross reference to the flight instruments will indicate the level of performance achieved. For example an aircraft climbing will adopt the climb attitude with climb power, reference to the ASI will indicate the correct attitude, reference to the DG will indicate direction, and reference to the turn coordinator will indicate the aircraft in balance.

The VSI will indicate the rate of climb which will vary from one aircraft to another.

In the absence of the natural horizon the AH becomes the pilot's miniature indicator of attitude and cross reference to the instruments should be made selectively depending on manoeuvre.

The central position of the AH enables the pilot to selectively cross refer to the flight instruments in a radial pattern. We call the method a SELECTIVE RADIAL SCAN and will look at various manoeuvres to understand which instruments have priority.

25.5.5 Cruise

The priority instruments in the cruise are the AH, ALTIMETER and DG. The AH should be monitored with attitude and power set and the aircraft trimmed, Eye movement should momentarily move across to the altimeter and back again to the AH to determine correct attitude is being maintained. To check direction is being maintained eye movement should momentarily drop to the DG and back to the AH. The selective radial scan should continue with occasional reference to the other Instruments.

25.5.6 Climbing

The priority instruments in a climb are the AH, ASI and DG. The AH should be monitored with power and attitude set for climb and the aircraft trimmed. Eye movement should be momentarily moved across to the ASI and back to the AH to determine correct attitude. To check direction is being maintained the eye movement should momentarily move to the DG and back to the AH. The other instruments should be scanned occasionally with the altimeter becoming a priority as the desired altitude is approached.

Figure 25-4 Climbing

25.5.7 Turning

The priority instruments in the turn are the AH, ALTIMETER and DG. The AH should be monitored with power and attitude set for a rate one turn. The aircraft should remain trimmed for cruise and not re-trimmed for the turn as it is only a transitionary manoeuvre. Eye movement should momentarily move across to the altimeter and back again to the AH to determine the correct nose attitude. The DG should be scanned to determine the amount of turn still required and the other instrument should be occasionally scanned as required.

Figure 25-5 Turning

25.5.8 Pilot Actions for Inadvertent Entry into Cloud

Should the aircraft ever enter cloud it is essential the pilot relies solely on what the instrument tell him. Under no circumstances should the physiological senses be trusted as the illusions will invariably be incorrect.

The first action when encountering IMC (Instrument Meteorological Conditions) is to fly the miniature aircraft on the AH and ensure the aircraft is under control. Secondly using the appropriate scan technique adopt a rate one turn onto the reciprocal of the heading held when the entry was made.

Under no circumstances should continuation in cloud be considered unless the pilot is appropriately rated.

25.5.9 Scans for Various Performances

Table 25-1 Scans for Various Performances

Performance	AH	DG	ASI	VSI	ALT	T&B
Straight and Level	P	S	S	S	P	P
Medium Turns	P	S	S	S	P	P
Climbing and Descending	P	S	P	S	S	P
Climbing and Descending Turns	P	S	P	S	S	P

25.5.10 Lesson Construction

To develop the required skill in instrument flying, practice is essential; the air exercise will be executed as follows:

- Maintaining Straight and Level flight onto a nominated heading and altitude
- Transitioning between cruise speeds in straight and level Entering, maintaining and exiting climb and descent
- Rate 1 turns
- Timed turns without reference to D.G
- Simulated entry into cloud with the application of appropriate actions to return to VMC conditions.
- Unusual Attitude Recovery

Table 25-2 Threat and Error Management

Threat and Error	Management
Traffic	Pilot not flying (Instructor) maintain and executing all lookouts during manoeuvres
Unusual Altitudes	Reliance on Instruments not Senses Smooth Positive Recovery Techniques
Instrument Fixation	Employ and Maintain correct Scanning Techniques

26 Precautionary Search

26.1 Aim

To safely execute a precautionary search procedure at an unknown airfield and to be able to determine it's suitability for landing.

26.2 Objectives

- Determine a suitable field for conduct of the procedure using the standard field selection criteria from the Forced Landings Exercise
- Accurately ascertain wind strength using environmental indicators other than a windsock.
- To control the aircraft safely throughout the entire procedure.
- To be able to apply the procedures over an unprepared field and accurately determine its suitability for landing.
- Maintain the following standards for each pass:
  - 500' Pass: Airspeed +/-5KIAS; Heading +/-5°, Altitude +/-100'
  - 250' Pass: Airspeed +/-5KIAS; Heading +/-5°, Altitude +/-70'
  - 50' Pass: Airspeed +/-5KIAS; Heading +/-5°, Altitude +20/-0'
- Manage Passengers and inform personnel on the appropriate area frequency of current situation and pilot intentions. (This simulated for the air exercise)
- For the exercise; land the aircraft safely in a prepared ALA where the surface appears to have deteriorated.
- Or in the actual scenario be able to land the aircraft safely into unprepared field or an unknown ALA that requires thorough assessment of field conditions prior to landing.

26.3 Application

It is important to note that for the vast majority of cases the need to execute a precautionary search usually arises due poor preparation of the flight prior to departure. A precautionary search can normally be avoided if the pilot properly plans for the flight by ensuring that he/she carefully considers all factors involved. Some of the most common areas that are overlooked and create the need to execute such a procedure are due to an insufficient assessment of the current forecast and considerations of the impacts that weather will have on the planned exercise, an inaccurate or a substandard level of fuel planning and an oversight of End of Daylight. The message here is; Proper Prior Preparation Prevents Poor Performance; prepare for all your flights thoroughly and you can most probably assume that you will never find yourself in such a position.

Despite this, it is still important to learn and commit to memory on how to conduct a precautionary search as it could very well one day save your life. This procedure is used as a last resort and provides the individual with assurance that a systemic process is implemented.

A process that identifies and prioritises tasks effectively, considers the majority of safety factors involved, and procures toward an end goal that ensures the safest possible outcome; in conditions that are normally highly stressful and difficult to operate in.

26.4 Revision

A part of this exercise is to accurately determine wind strength, an old mariner once made the effort to accurately observe changes in the environment and correlate these environmental signs to wind speed. Below is Beaufort's Wind Scale and is useful to aviators in estimating wind strength which in turn will assist in determining field length available for landing.

Beaufort Scale Number	Descriptive Term	Units in km/h	Units in knots	Description on Land	Description on Sea or Water
0	Calm	0	0	Smoke rises vertically	Sea like a mirror.
1-3	Light winds	19 km/h or less	10 knots or less	Wind felt on face; leaves rustle; ordinary vanes moved by wind.	Small wavelets, ripples formed but do not break: A glassy appearance maintained.
4	Moderate winds	20 - 29 km/h	11-16 knots	Raises dust and loose paper; small branches are moved.	Small waves - becoming longer; fairly frequent white horses.
5	Fresh winds	30 - 39 km/h	17-21 knots	Small trees in leaf begin to sway; crested wavelets form on inland waters	Moderate waves, taking a more pronounced long form; many white horses are formed - a chance of some spray
6	Strong winds	40 - 50 km/h	22-27 knots	Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty.	Large waves begin to form; the white foam crests are more extensive with probably some spray

Beaufort Scale Number	Descriptive Term	Units in km/h	Units in knots	Description on Land	Description on Sea or Water
7	Near gale	51 - 62 km/h	28-33 knots	Whole trees in motion; inconvenience felt when walking against wind.	Sea heaps up and white foam from breaking waves begins to be blown in streaks along direction of wind.
8	Gale	63 - 75 km/h	34-40 knots	Twigs break off trees; progress generally impeded.	Moderately high waves of greater length; edges of crests begin to break into spindrift; foam is blown in wellmarked streaks along the direction of the wind.
9	Strong gale	76 - 87 km/h	41-47 knots	Slight structural damage occurs - roofing dislodged; larger branches break off.	High waves; dense streaks of foam; crests of waves begin to topple, tumble and roll over; spray may affect visibility.
10	Storm	88 - 102 km/h	48-55 knots	Seldom experienced inland; trees uprooted; considerable structural damage.	Very high waves with long overhanging crests; the resulting foam in great patches is blown in dense white streaks; the surface of the sea takes on a white appearance; the tumbling of the sea becomes heavy with visibility affected.
11	Violent storm	103 - 117 km/h	56-63 knots	Very rarely experienced - widespread damage	Exceptionally high waves; small and medium sized ships occasionally lost from view behind waves; the sea is completely covered with long white patches of foam; the edges of wave crests are blown into froth.

Beaufort Scale Number	Descriptive Term	Units in km/h	Units in knots	Description on Land	Description on Sea or Water
12+	Hurricane	118 km/h or more	64 knots or more		The air is filled with foam and spray. Sea completely white with driving spray; visibility very seriously affected

Discuss these indicators with your instructor and how can be interpreted to be of use in the air.

26.5 Air Exercise

Figure 26-1 Air Exercise

For the purpose of the exercise the Precautionary Search will be conducted at Tooradin Aerodrome, Standard Join Procedures will apply, but once established in circuit area Instructor will simulate conditions conducive to justify conduct of a Precautionary Search:

– Cloud < 900' AGL o Reduced Visibility o Approaching End of Daylight

1. After joining field establish the Aircraft in a Low Level Circuit at 500' AGL then commence procedure by:

   – Recognising Conditions and requirement for conduct of search.
   – Configure Aircraft for Precautionary Search:

Table 26-1 Flaps, Speed, RPM

C152	C172	PA-28
Flap 20º	Flap 10º	Flap 20º
70 kts	80 KIAS	80 kts

C152	C172	PA-28
2000 RPM	1800 RPM	2100 RPM
Adjust Power Accordingly to Maintain Speed		

2. Execute landing Checks on Downwind and prepare aircraft for first 500' AGL Pass. Turn Base at normal position, do not descend. Turn Final, again maintain altitude and position aircraft to remain on a track that will parallel runway so the landing area can be comfortably viewed from pilot's seat. Prior to Commencement of pass confirm:
   - Airspeed 80 KIAS and Steady o Altitude 500' AGL
   - Aircraft is accurately trimmed
   - Heading is established for a paralleled track for conduct of pass and runway can be comfortably viewed from pilot's seat.
3. 500' AGL PASS:
   - Just prior to passing abeam landing threshold, reset ADF timer or look at watch to time length of field.
   - Align heading bug to runway heading or DG to North for runway direction
   - During Pass, check for obstacles or obstructions abeam the field to confirm safe for next pass at 250'
   - Check for any major obstructions on field that may determine it unserviceable for landing, Confirm Wind, Size (by time), Surface, Shape, Slope, Surroundings and Services all meet most optimum criteria for landing.
   - Abeam upwind threshold take note of time on ADF timer or watch and calculate time taken to execute pass.

NOTE:

In nil wind 70Kts is approx. 35m/sec, 80Kts is approx. 40m/sec. A minimum time for field length should be at least 12 seconds theoretically providing 420 metres(70Kts) or 480 metres(80Kts) for landing. For a 10kt headwind add 1 second to 12 seconds to establish safe field length. 13 Seconds. For a 20kt headwind add 2 seconds to 12 seconds to establish safe field length. 14 Seconds. For a 30kt headwind add 4 seconds to 12 seconds to establish safe field length. 16 Seconds. For a 40kt headwind add 8 seconds to 12 seconds to establish safe field length. 20 Seconds. For a 50kt headwind add 16 seconds to 12 seconds to establish safe field length. 28 Seconds

4. Downwind Leg: If the field is deemed suitable to justify further progress with the precautionary search, execute downwind checks in case immediate landing is required and prepare for 250' Pass.

5. 250' AGL Pass: Turn Base at normal circuit position, do not descend to this altitude until established on the final leg of the circuit. When established on final and at 250' confirm:
   - Airspeed 70Kts(C152), 80 Kts(C172/PA28) and Steady
   - Altitude 500' AGL
   - Aircraft is accurately trimmed
   - Heading is established for a paralleled track for conduct of pass and runway can be comfortably viewed from pilot's seat. This time aircraft will be positioned a little closer to field to enable proper assessment from 250'.
   - Before reaching abeam field assess the undershoot area (a clear area before the planned touchdown point). Ideally it should be clear of any obstacles and livestock, providing room for error in misjudgement of the final approach for landing and also confirming it is safe to descend to 50' AGL for execution of the 50' Pass Abeam Field, Inspect for any indications of undesirable surface conditions and continue to scan for obstacle that may obstruct the ability to execute a 50' Pass.
   - Passing the upwind threshold, confirm that the overshoot (a clear area after the end of the planned landing area) is also clear of obstructions and that a safe climb can be executed from 50' AGL to 500' circuit height on the upwind leg.
   - Execute a go around, keeping flaps extended and maintain 80 KIAS in the climb to 500' upwind then turn to re-establish aircraft in a 500' circuit around the landing area.
6. Downwind Leg: If the previous inspection satisfies the requirements to execute the final 50' Pass it is most probable that the pilot will be sure of a safe landing. Therefore on this downwind leg, execute a PAN PAN call on the relevant area frequency. The call will be simulated for the exercise but it is expected that you vocalise the call on this leg for the purposes of training. The radio call will entail the following set of information:
   - "PAN PAN, PAN PAN, PAN PAN, Melbourne Centre, APTA(Callsign 3 times), is executing a precautionary search at Tooradin (or provide approximate position), due Weather (or other factor that has created the need to execute procedure), 2 POB (number of people on board), will attempt to contact again once landed." After completing this call conduct downwind checks.
7. 50' AGL PASS: Again do not descend below 500' until established on final leg. Once established on final, commence descent to 50' AGL ensuring aircraft will be at this height just prior to commencement of the pass. This is a pass that contains significant risk due to the height above ground and should not be attempted in moderate to severe turbulent conditions. In addition the inspection is the secondary priority to accuracy in handling to ensure a safe pass is executed. To best manage these risks confirm that:

- Airspeed 70Kts(C152), 80 Kts(C172/PA28) and Steady o Altitude 50’ AGL
- Aircraft is accurately trimmed
- Heading is established for a paralleled track for conduct of pass and runway can be comfortably viewed from pilot’s seat. This time aircraft will be positioned a little closer to field to enable proper assessment from 50’. During the entire duration of the pass it strongly recommended that you adopt and cycle through the following scan:
  - (T)rack is parallel to runway
  - (H)eight is steady and at 50’ AGL
  - (A)irspeed is steady and at 70Kts(C152), 80 Kts(C172/PA28)
  - (R)unway surface is suitable for landing and clear path ahead for continuation of pass.
- When abeam upwind threshold; execute a go around, keeping flaps extended and maintain 70Kts(C152), 80 Kts(C172/PA28) in the climb to 500’ then turn to re-establish aircraft in a 500’ circuit around the landing area.

8. Downwind Leg: If the previous inspection satisfies the requirements to execute a landing. It is time to prepare for the landing. A passenger brief will be necessary to notify them of the situation and inform them of what they need to do once on the ground. Ensure Landing Checks are conducted on downwind as well.

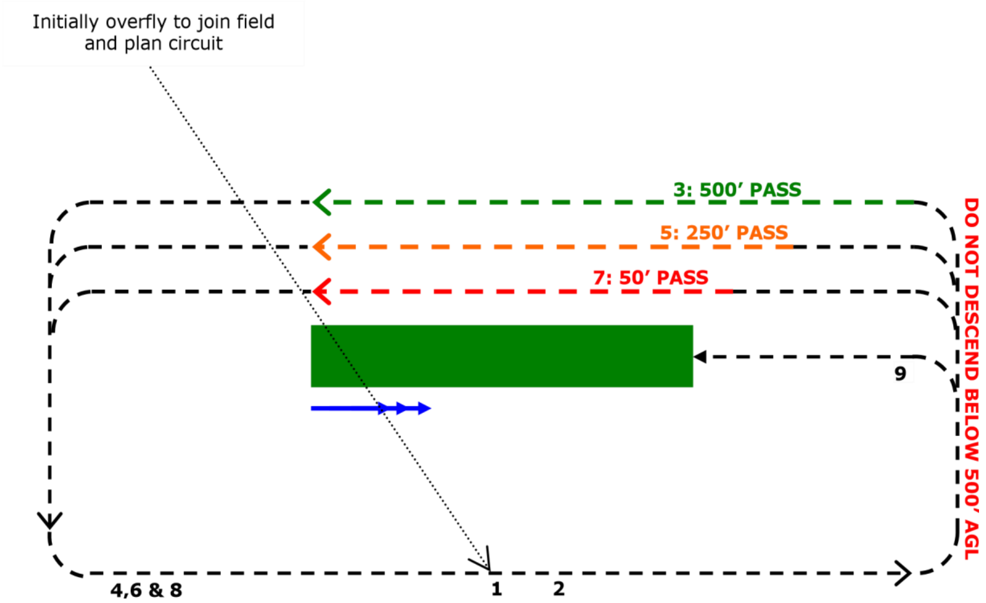
9. Landing: Execute a shortfield full stop into the field. Once at a complete do not continue to taxi. Call ATC to notify them of a successful landing and get out aircraft to further inspect to ensure no further taxi hazard exists.

Diagram of Precautionary Search Pattern:

NOTE:

Numbers depicted on diagram below denote the position of where to execute the numbered items throughout the air exercise explanation above and on previous pages.

Figure 26-2 Precautionary Search Pattern



26.5.1 Considerations

- If executing this procedure under duress, with no nearby ALA's available, and as a result conducting this into a field. Take the time (if available) to select the most optimum field in your area. Therefore configure the aircraft to the Precautionary Search Configuration and start a systematic search for the most optimum landing area. Rather than hastily selecting a field that may not be suitable.
- A precautionary search may also be advisory when landing in a prepared ALA if the strip conditions appear to be below safe standard i.e.:
  - Pot holes
  - Rocks
  - Water
  - Drain
  - Excessively long grass
- If executing the procedure for the reason above and under no duress, the PAN PAN call is now obviously unnecessary. A pax brief may be useful however to keep them informed of pilot intentions, this preventing confusion and possible anxiousness from arising.

Table 26-2 Threat and Error Management

Threat and Error	Management
Passenger	A frightened Passenger is potentially hazardous ensure they are controlled a Passenger Brief will assist in doing so
Moderate to Severe Turbulence	Do not do 50' Pass

Threat and Error	Management
Undesired Aircraft State	Ensure if off tolerances, task manage effectively and prioritise flying over the precautionary search procedure
Pilot Decision	Resist the temptation to “push on”, if evident that safe flight is not possible and no other resolution available conduct the precautionary search. An Early Decision is a good decision
Pilot Reaction	Ensure you remain calm and keep a clear thought process going, an anxious pilot will make abrupt and illogical decision. Try to remain as calm as possible

Intentionally Blank

27 Fire Drill

27.1 Aim

To understand be able to apply the emergency actions in the event of an aircraft fire.

27.2 Objectives

- Be able to source information from the Pilot Operating Handbook identifying engine or aircraft fire drills.
- Be able recall and apply key critical actions on the occurrence of an engine or aircraft fire.
- Understand the importance of the pilot responsibility to report such events to the aircraft's owner and operator.

27.3 Application

In the unlikely event of an aircraft fire, the pilot needs to be able perform immediate actions to provide optimum chance of extinguishing the flames as quickly as possible to prevent any further damage or possible harm to the occupants on board. As a result it is necessary to have sound knowledge of the procedures involved on occurrence of an engine or aircraft fire.

27.4 Air Exercise

At some point in the later stages of your training, your instructor will randomly simulate some or all of the following scenarios:

- Engine Fire During Start
- Engine Fire In Flight
- Electrical Fire in Flight
- Cabin Fire in Flight
- Wing Fire in Flight

Refer to the Emergency Checklists for the aircraft. These checks should be committed to memory. The procedures for each aircraft however are highlighted on the following pages.

Procedures from POH for C152/C172R:

ENGINE FIRE:

ON GROUND

MIXTURE	ICO
THROTTLE	OPEN
FUEL SHUTOFF	PULL(C172),OFF(C152)
STARTER	CRANK
FUEL PUMP	OFF(C172)
FUEL SHUTOFF	PULL(C172), OFF(C152)
MASTER	OFF
FUEL PUMP	OFF(C172)
HEATER	OFF
DEFROSTER	OFF

INFLIGHT

MIXTURE	ICO
FUEL SHUTOFF	PULL (C172), OFF (C152)
FUEL PUMP	OFF (C172)
MASTER	OFF
HEATER	OFF
DEFROSTER	OFF

IF ENGINE STARTS

POWER	1700RPM (2 MINS)	AIRSPEED 85KTS (C152), 100KTS (C172)
ENGINE	SHUTDOWN	LAND ASAP
EXTINGUISHER	EMPLOY	

WING FIRE

LANDING/TAXI LIGHT	OFF
NAV LIGHT	OFF
STROBELIGHTS	OFF
PITOT HEAT	OFF

ELECTRICAL FIRE

MASTER	OFF
AIR VENTS	CLOSED
CABIN HEAT	OFF
EXTINGUISHER	EMPLOY AT BASE OF FIRE
AVIONICS	OFF
AIR VENTS	OPEN
LAND	ASAP

CABIN FIRE

MASTER	OFF
AIR VENTS	CLOSED
HEATER	OFF
EXTINGUISHER	EMPLOY
AIR VENTS	OPEN

27.4.1 Procedures from POH for PA-28

ENGINE FIRE

ON GROUND

STARTER	CRANK
MIXTURE	ICO
THROTTLE	OPEN
FUEL PUMP	OFF
FUEL SELECTOR	OFF

INFLIGHT

FUEL SELECTOR	OFF
THROTTLE	IDLE
MXTURE	ICO
FUEL PUMP	OFF
HEATER	OFF
DEFROSTER	OFF

ELECTRICAL FIRE

MASTER	OFF
VENTS	OPEN
CABIN HEAT	OFF
LAND	ASAP

Figure 27-1 Engine Fire

28 Side Slipping

Figure 28-1 Side Slipping

28.1 Aim

To able to execute a side slip with varying applications of rudder and aileron to obtain desired descent rates, whilst maintaining a constant speed and heading.

28.2 Objectives

- Correctly coordinate the use of rudder and aileron to maintain an identified track to within +/-5°.
- Increase or Decrease the rate of descent by varying the application of rudder and aileron inputs whilst coordinating these inputs correctly.
- Identify and maintain a selected reference point accurately
- Maintain reference airspeed to +/-5KIAS

- Maintain reference heading to +/-5°

28.3 Application

This is a useful technique to further increase rate of descent during a glide approach or on final in the forced landing, if application of flap is not available. Side s lipping an aircraft with the full application of controls will dramatically increase the rate of descent, and as result may be of great use to the pilot if he/she finds themself far too high during the final stages of the approach. It is unable to be used in some aircraft (such as the C172) if flaps are already extended. The pilot as result must be aware of the limitations of the aircraft when utilising this procedure. Furthermore side slipping is an exercise that can potentially improve pilot coordination.

28.4 Air Exercise

A few important points to note prior to discussing the air exercise:

- Resultant path of descent approx. 30 degrees to heading
- The greater the bank, the greater the rate of descent
- The greater the bank, the more opposite rudder required to prevent yaw
- The limiting factor to the maximum rate of slide slip possible is the amount of rudder available
- The maximum rate of slide slip occurs at the angle of bank requiring full opposite rudder to prevent yaw
- Nose tends to yaw towards lower wing due directional stability – therefore use opposite rudder
- Wings tend to return to level due lateral stability – therefore hold bank constant
- Slight forward pressure required to maintain sideslip nose attitude in high wing aircraft

28.4.1 Pre Manoeuvre

1. Select Reference point/Reference Altitude to which you are descending toward
2. Confirm Safe by Lookout (Also Confirm clear below aircraft in planned direction of descent travel).
3. Commence Manoeuvre:
   - Establish aircraft in a glide descent plus 5KIAS.
   - Apply Bank
   - Apply Opposite Ride to prevent further roll
   - Apply Forward pressure to maintain desired speed
4. Monitor Manoeuvre:

- (A)ttitude is set to maintain speed
- (L)ookout
- (A)ttitude confirm still tracking toward reference point adjust rudder input as required.
- (P)erformance observe rate of descent, confirm airspeed steady and scan to altimeter
- During the manoeuvre practice maintaining track whilst adjusting rate of descent with varying amounts of rudder and aileron.

5. Exit Manoeuvre (Anticipate Level Off by 50% ROD)
   - Wings Level
   - Rudder to bring aircraft back in balance
   - Return to Glide Attitude
   - Use 10% ROD in Glide to commence level off from Glide Descent.

After having practiced this manoeuvre to a satisfactory standard in the training area, further training will commence in the circuit in flapless and glide approaches. The slide slip technique will be applied on the final leg of the circuit.

Table 28-1 Threat and Error Management

Threat and Error	Management
Traffic	Unusual manoeuvre making lookout difficult, ensure a vigilant lookout is executed before maintained during practice of manoeuvre
High Rates of Descent	Never side slip below 200' on the approach
Undesired Aircraft State	Ensure if off tolerances, task manage effectively and prioritize flying over the precautionary search procedure
Aircraft Limitations	Do not Side Slip with flaps extended in C172 Limit application of manoeuvre when side slipping PA28 with more than 20° of flaps extended
High Drag Manoeuvre	Careful Monitoring of Airspeed during ALAP scan, if slow apply forward pressure to maintain speed
High Likelihood of Spin	Ensure airspeed is kept well above stall speed

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29 Ditching

Figure 29-1 Ditching

29.1 Aim

To understand how to adapt a forced landing plan, based on the considerations of this brief; that will provide the best possible chance of executing a successful ditching.

29.2 Objectives

- To understand how to adapt the Forced Landing Procedure to land on water.
- To be able to apply and recall the considerations of this briefing to recognise the best course of action to complete a ditching procedure.
- Demonstrate ability to assess conditions on the water and plan the most appropriate cause of action.

29.3 Application

In the unlikely event of an engine failure over water, the pilot must be able to appropriately assess conditions and plan a forced landing providing the best possible chance of survival. Standard Forced Landing Procedures will apply; however, initiative needs to be taken to adapt the procedure to best conform to the developed plan. Ditching into can be avoided if remaining within glide distance of land, if however it is unavoidable it is mandatory that life jackets are carried on board the aircraft when planning flight over water and the aircraft is outside glide distance.

29.4 Revision

29.4.1 Forced Landing Procedure

- Recall all Checks and Procedures
- Identify Direction and Strength of Wind
- Recall Best Glide Speed for Aircraft Type.

29.5 Air Exercise

An Example of the required actions to execute on occurrence of an Engine Failure over Water:

- Radio - Transmit MAYDAY on 121.5MHz, giving location and intentions and SQUAWK 7700.
- Heavy Objects (in Baggage Area) - Secure or Jettison.
- Passenger seat backs - Most upright position.
- Seats and seat belts - Secure.
- Wing flaps - 0º to 10º.
- Power - Establish 300FT/MIN descent at 65 kts.

NOTE:

If no power is available, approach at 65kts with flaps up or at 60kts with 10º flaps.

- Approach - High winds, heavy seas - into the wind. Light seas, light winds, heavy swells - parallel to swells.
- Cabin doors - unlatch.
- Touchdown - Level attitude at established rate of descent.
- Face - Cushion at touchdown with folded coat.
- ELT - Activate.
- Airplane - Evacuate through cabin doors. If necessary, open window and flood cabin to equalize pressure so doors can be opened.
- Life vests and raft - Inflate when clear of airplane.

29.6 Considerations

- Ditch into wind if the surface is smooth.
- Ditch along the swell when a pronounced swell or rough sea is apparent.
- Do not use more than optimum flap settings: 10 for C152/C172 and 0 for PA28.

- Aircraft with retractable undercarriage do extend landing gear
- Swell does not necessarily bear any relation to the surface wind direction.
- Water appears to be calmer from the air than it is.
- On landing, speed and rate of descent should be as low as possible.
- Brief passengers to be prepared for a double impact, to cover their heads with their arms and not to undo harness until aircraft stops, life jackets on (but not inflated prior to impact) When flying over water below 2000', regulations require all occupants to wear life jackets.
- Refer to CASA website for further Information on Ditching: CAAP 253-1(1)

Table 29-1 Threat and Error Management

Threat and Error	Management
Fuel	When planning flight over water it may be sensible to plan with extra fuel, due limited reference for positive fixing during flight
Engine	Monitor Engine Oil Temperature and Pressures, for early warning signs of possible engine failure Avoid Large Changes in power setting over water
Pilot Currency	Ensure you are well rehearsed with Forced Landing Procedures
Preparation for Flight	When executing a flight over water, plan nav to be aware of nearby islands to provide opportunity for landing on land rather than water

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30 Spinning

Figure 30-1 Spinning

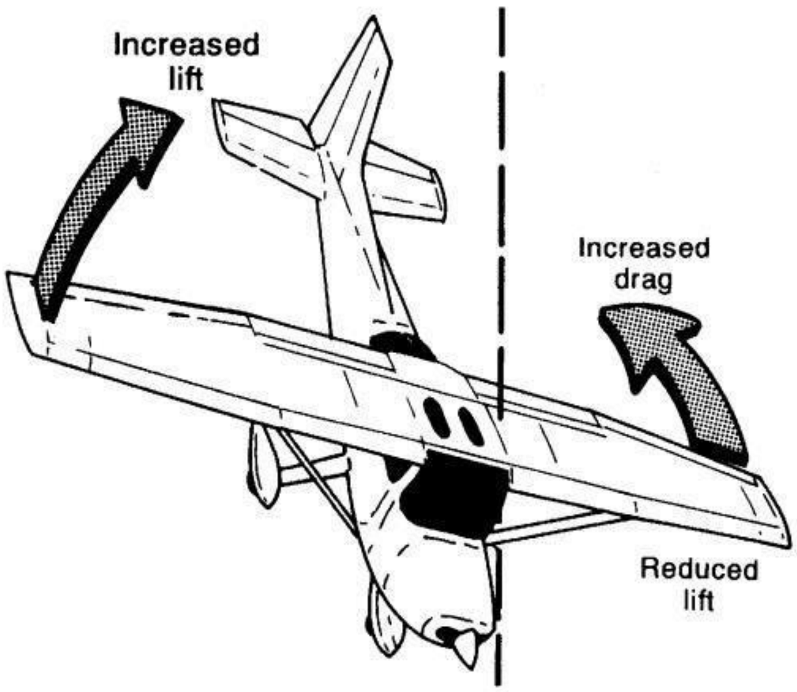

Fig.11a-3. When stalled, reduced lift and increased drag on a dropping wing causes autorotation.

30.1 Aim

To recognise the symptoms of a fully developed spin and recover using appropriate control techniques with minimum of height loss.

30.2 Objectives

- Recognise the symptoms of a fully developed spin
- Recover Safely from a fully developed spin with minimum of height loss
- Understand the implications of applying insufficient forward elevator pressure during the recovery phase.
- Recognise the dangers involved executing a spin solo without formal approval.

- Recognise the threats and errors involved with the exercise and manage these appropriately.

30.3 Application

The spin manoeuvre is part of the Aerobatic Syllabus, and should not be attempted solo if not approved to do so. This lesson is conducted primarily to enable a pilot to recover from a spin if inadvertently entered. High risk manoeuvres that are conducive toward inadvertent spin entry are side slipping and stalling. This exercise will also further improve pilot coordination and attitude recognition.

Understand a spin should never occur unintentionally, however, if entered, the correct method of recovery should be used.

30.4 Air Exercise

1. Pre Manoeuvre
   - Height Sufficient to recover by 3000'
   - Hatches and Harnesses Secure
   - Engine FMOST Check Fuel Quantity, Selectors, Pumps, Mixtures, Masters, Magnetos, Oil Temperatures and Pressures, Throttle.
   - Location Not over a built up area
   - Loose articles Secured
   - Lookout 360° Clearing Turn for Initial Stall, 90° Clearing Turn for every stall thereafter.
   - Select Reference point
     Reference heading
     Reference Altitude
   - Configure Aircraft – Flaps Up, Carburettor Heat On (If Applicable)
2. Commence Manoeuvre:
   - Throttle to idle
   - As IAS decreases gradually increase back pressure to maintain altitude
   - Use Rudder to keep wings level
   - Note:
     - The Slow and decreasing Airspeed - High and Increasing Nose Attitude
     - Reducing Effectiveness of Controls
     - Stall Warning (turn off carburettor heat if applicable) - Buffet
3. Entry into Spin:

- At or Approaching the stall, apply full back pressure and full rudder in desired the direction of rotation
- As aircraft rotates past reference point count number of rotations.
- Reaching the predetermined number of spins, begin recovery

4. Recovery

- Exit inertia will take 1/4 of a spin rotation, so to exit on reference point, begin exit approx 900 before reference point.
- Apply Forward Elevator Pressure
- Apply Opposite Rudder to stop rotation
- Once rotation has ceased and airspeed is safe, raise the nose to BROC attitude and apply full power to climb back to reference heading and height.
- Recovery must be complete before 3000 feet AGL

Table 30-1 Threat and Error Management

Threat and Error	Management
Disorientation	Refer to Reference Point, if cannot re-orientate call “YOU HAVE CONTROL”
Structural Integrity	Smooth Positive Control Inputs Monitor Airspeed before pulling out from dive during spin recovery
Pilot Flying	Correct “I Have Control” “You Have Control” procedure
Collision into Terrain	Execute HHELLL Check
Inverted Spin	Careful Application of forward pressure during recovery

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31 Pre-License

31.1 Aim

To have a clear understanding of how an RPL test is executed and to gain a clear understanding of the expectations of the testing officer and responsibilities of the participant on test day.

31.2 Objectives

- Understand the format the Ground and Flight Test will take on test day
- Confirm familiarity with all items on the RPL test form
- Be able to appropriately explain all items for Ground Component of the RPL test
- Be able to demonstrate competence in all items for the flight component of the RPL test.
- Be able demonstrate satisfactory levels of airmanship throughout the entire conduct of the test.

31.3 Application

The pre licence is useful to the student to gain an understanding of the process involved for the actual test. It will help clarify any misconceptions you may have with reference to theory, flight handling, ATO Conduct, your Conduct and recognising the responsibilities you have to display a satisfactory standard for the issue of a RPL.

31.4 Recommended Preparation

It is strongly advised that you prepare thoroughly for the pre licence, ensure you cover all Basic Aeronautical Knowledge Requirements relevant to the RPL and that you familiar with the test form. Go over these items with your instructor before booking in for a pre licence.

Prior to your Pre Licence; you and your instructor must ensure:

- Student Records and Pilot Log Book are up to date
- All Competencies have been signed off by your instructor
- Student has revised all basic aeronautical knowledge components relevant to the RPL.
- Student has covered all items of training required for issue of a RPL in accordance with Company Operations Manual.
- There is no remaining ambiguity on Standard Operating Procedures for all RPL sequences as highlighted in RPL Training Notes.

31.5 Ground Exercise

31.5.1 Theory Component

You will be tested on all of the following items for the Pre Licence and RPL Test.

Know privileges & limitations of licence/RPL – refer to Part 61.E, 61.G

The holder of an RPL licence :

- Can fly a single engine aircraft as PIC or co-pilot that has a maximum take-off weight of not more than 1500kg and
- The aircraft is certified for single pilot operation and the flight being conducted is a private operation or the holder is receiving flying training.
- Can operate the aircraft's radio communication system for the purposes of the flight if also hold a flight radio endorsement.
- Flight must be by day under the VFR.
- Flight is conducted in the circuit pattern, training area or within 25 nm of the departure aerodrome or the direct route between departure aerodrome and the training area.
- Can carry more than 1 passenger if you hold a current class 1 or 2 medical or is accompanied by another pilot who holds a class 1 or 2 medical and occupies a flight control seat and is authorised to pilot the aircraft.
- Can pilot an aircraft outside of the 25 nm from the departure aerodrome only if they hold a Recreational Navigation Endorsement.
- Can pilot an aircraft in controlled airspace only if they hold a Controlled Airspace Endorsement.
- Can pilot an aircraft at a controlled aerodrome only if they hold a Controlled Aerodrome Endorsement.

WHAT ARE THE RECENCY AND EXPERIENCE REQUIREMENTS & WHAT OTHER CONSIDERATIONS ARE THERE PRIOR TO COMMENCING A FLIGHT?

- Must ensure you have done three takeoffs and landings in the last 90 days if wish to carry passenger/s.
- Must have a current medical. Class 1 or 2 or recreational aviation medical practitioners certificate, sent CASA a copy of the certificate and received a written acknowledgement from CASA confirming receipt of the certificate. The CASA acknowledgement and medical practitioner's certificate must be carried in flight.
- Flight Review Requirements.(refer to part 61 regulations) 61.E, 61.L.4
- Any Operator (APTA) requirements.

Obtained information from Flight Manual:

- Candidate should be familiar with the relevant POH and AFM
- Title and content of each POH section. Including any STC Supps.
- Have a sound knowledge of what and where information is located in the POH/ AFM. Be able to locate information as requested within sections.
  - Including but not limited to:
    - Airspeeds
    - Limitations
    - Conversion Factors
    - Systems
    - Handling
    - Service
    - Maintenance
    - Supplements

Applicability of drug and alcohol regulations (MOS 2.1(b))

- 8 HOURS BOTTLE TO THROTTLE
- Pilot's performance must not be affected by the consumption of alcohol or drugs i.e. not to be hung-over.
- CASR 99 Awareness, Testable substances, Application of 0.02% BAC to flying, Everyday knowledge of basic over counter and prescription medicines and application to AOD testing and flying. Information on this can be found at the CASA website and should be read.

Some understanding required.

- Drug and alcohol management plan and what are your obligations. 0.02 % BAC.
- What does 0.02% BAC mean to you?
- Awareness of APTA DAMP Policy.
- Awareness of "over the counter" & "prescription" medicines in relation to APTA DAMP & CASR 99.
- Who to consult if unsure of fitness to fly on medication.
- CAR 256 – Intoxicated persons not to act as pilots etc. or be carried on aircraft.

Aircraft Speed Limitations (MOS 2.1(g))

KNOW IMPORTANT SPEEDS FOR YOUR AIRCRAFT

Table 31-1 Important Speeds

Speed	Description	Red Line	Velocity
V_{NE}	Velocity Never Exceed		Kts

Speed	Description	Red Line	Velocity
V_A	Manoeuvring Speed		Kts
V_B	Turbulence Penetration		Kts
MAX X/W	Cross Wind		Kts
V_{FE}	Maximum Flap Extension Speed	White Arc.	Kts
V_S	Stall Speed at MTOW	Clean	Kts
		Full Flap	Kts
V_{NO}	Velocity Normal Ops	Green	Kts
Glide Speed		Clean	Kts
		Full Flap	Kts

ASI Arc's, speed ranges, significance, limitations to operations, and relevance to a/c configuration for specific limitation/s.

- Knowledge & application of the red radial line on the ASI.
- Knowledge & application of the yellow arc on the ASI.
- Knowledge of why flight within the yellow arc only in smooth air.
- Knowledge & application of the green arc on the ASI.
- Knowledge & application of the white arc on the ASI.
- Knowledge of what conditions and aircraft configuration Stall speed is determined by manufacturer.

Discussed Actions in the Event of Partial Loss of Power:

- Describe actions in the event of a partial engine failure by having a comprehensive plan for Partial Power Loss (i.e.: able to maintain altitude at slow cruise) applicable for RPL flight.

Refuel Aeroplane (may be discussed) CAO 20.9

- Refuelling – Knowledge & application of Fuels & Oils, Fuelling of Aircraft, Starting & Ground Operations of Engines, Refuel Procedure.
- Refuelling considerations. Distances, Precautions and Procedure
- WHAT COLOUR IS AVGAS? AVGAS LL?
- WHAT IS THE COLOUR OF MOGAS?
- WHAT IS THE COLOUR OF AVTUR?
- Requirements for fire extinguishers i.e. numbers and distance
- WHEN MUST FUEL BE TESTED FOR THE PRESENCE OF WATER OR CONTAMINANTS?

Knowledge & Practical Application of the Following:

- CAO 20.11.14 – Briefing of passengers.
- CAO 20.16.3 – Seats.
- CAO 20.16.3.4 – Seat belts & safety harnesses.
- CAO 20.16.3.5 – Adjustment of seats.
- CAO 20.16.3.9 – Stowage of loose articles.
- CAO 20.16.3.11 – Carriage of passengers in seats at which dual controls are fitted.
- CAO 20.16.3.13 – Carriage of infants & children.
- CAR 228 – Unauthorised persons not to manipulate controls.
- CAR 255 – Smoking in aircraft
- CAR 256A – Offensive and disorderly behaviour.
- CAR 254 – Exits and passageways not to obstructed.
- CAR 251 – Seat belts and safety harness.
- CAR 249 – Prohibition of carriage of passengers on certain flights.

WHAT IS THE MAXIMUM NUMBER OF PEOPLE THAT CAN BE CARRIED IN THE AIRCRAFT? (CAO 20.16.3.12)

- We can only every carry one more person than there are seats. In the warrior or Cessna that means we cannot have more than 5 people in the aircraft. Provided not combined lap/sash seat belts in rear seats.
- An infant is someone who has not reached their third birthday. A child is someone who has reached their third birthday but not their thirteenth.
- Two children can share a seat provided that their combined weight does not exceed 77kgs.
- An infant can sit on the lap of an adult passenger or in a child seat.

A STUDENT MUST ALSO BE ABLE TO DO EACH OF THE FOLLOWING:

- Point out the Fly neighbourly procedure in the ERSA for YMMB
- Describe your actions in the event of a radio failure. (ERSA) Knowledge & practical application of the symbols on the VTC chart.
- Describe an upwind join and an over fly procedure.
- Describe a precautionary search.
- Failure of Vacuum Pump (Suction indicating zero) what instruments are affected? How?
- With Blocked Pitot tube what instruments will be affected? How?

- What are the maximum levels in the training area CAR 225 – Pilots at controls.
- CAR 226 – Dual controls.
- CAR 224 – Pilot in command.

Once demonstrated a satisfactory level of knowledge student will be ready for Pre Licence Ground Theory and then Flight Test.

31.6 Air Exercise

Competency in all of this assessment criteria must be displayed before being recommended for a flight test.

Go over these items with your instructor before executing the pre licence.

Operational Communication using an Aeronautical Radio

"Demonstrate the skills and knowledge to operate radio-telephone and intercom equipment under normal and emergency flight conditions."

This may include but is not limited to the following: (see day VFR Syllabus for details.)

- Determine serviceability of and correctly use radio-telephone and intercom equipment.
- Maintain listening watch.
- Receive and transmit messages using standard radio phraseology.
- Demonstrate knowledge of radio failure procedures.
- Operate transponder correctly.

Start and Stop engine, Taxi Aeroplane

"Demonstrate the skills and knowledge to start and stop an aeroplane engine, perform all safety requirements, perform pre-taxi functions and manoeuvre an aeroplane on the ground without incident." This may include but is not limited to the following:

- Start and stop an aeroplane engine in accordance with approved check-list and safety precautions.
- Test brake function before commencement of taxi.
- Obtain ATIS and clearances required to start, taxi and cross runways.
- Comply with aerodrome rules and procedures and interpret aerodrome markings.
- Position flight controls and maintain safe control while taxiing in prevailing wind conditions.
- Perform instrument turning checks.
- Give way to aircraft on approach path.

Take-off an Aeroplane

"Demonstrate the skills and knowledge to complete pre-take-off checks, take-off (including crosswind conditions) and perform after take-off checks" This may include but is not limited to the following:

Pre-take-off:

- Ensures pre-take-off checks in accordance with approved check-list are complete.
- Performs take-off safety brief.
- Transmits ready call, responds with appropriate read-backs and complies with ATC instructions and clearances.
- Transmits appropriate non towered aerodrome broadcasts and ensures approach path is clear.
- Performs pre-line up checks in accordance with approved check-list.
- Lines up on the runway centre line ensuring that the approach path is clear.

Take-off aeroplane

- Sets take-off power, performs power, engine limitations and flight instrument checks.
- Accelerates aeroplane on runway centre line to nominated take-off speed.
- Positions flight controls consistent with maintaining control in a cross-wind.
- Rotates aeroplane at take-off speed.
- Sets climb attitude to achieve nominated climb out speed (+5, -0 kt.)
- Retracts flap (and undercarriage,) safe altitude and airspeed is confirmed.
- Rejects take-off if abnormalities during take-off experienced.

Carry out after Take-off Procedures:

- Performs after take-off checks in accordance with approved check-list.
- Tracks to maintain runway centre line and traffic separation.

Control an aeroplane in Normal Flight:

"Demonstrate the skills and knowledge to control an aeroplane while climbing, descending, turning, in straight and level, at slow speeds and to perform circuits and approaches while complying with airspace requirements."

This may include but is not limited to the following:

- Sets power and attitude to achieve specified performance.
  - Trims the aeroplane.
  - Balances the aeroplane.

- Allowance is made for wind drift.
- Monitors engine indicators and maintains engine parameters within limitations. Monitors airspeed and maintains airspeed within limitations. (i.e.: V_{FE}, V_B & V_{NO}) Operates in compliance with aerodrome rules and procedures.
- Aeroplane speed and circuit spacing is adjusted to follow and maintain separation from nominated circuit traffic.
- Performs pre-landing checks in accordance with approved checklist.
- Performs final approach checks in accordance with approved checklist.
- In smooth flight conditions the following tolerances apply:

Airspeed	Best angle climb	(+5, -0 kt)
	Best rate climb	(+5, -0 kt)
	Cruise climb	(±5 kt)
	Glide descent	(+5, -0 kt)
	Cruise descent	(±10 kt)
	Approach to land	(+10, -0 kt)
	Heading	(±10º)
	Altitude Normal	(±150 ft)
	In the circuit	(±100 ft)
	Angle of bank	(±5º)
	Rate of descent	(±150 fpm)
	Balance	(± ¼ ball)

- Circuit and approach is flown to the following
  - Tracking
  - Up-wind
  - Maintains RWY extended centreline
  - Cross-wind
  - Perpendicular to runway centre line not below 500 ft AGL.
  - Down-wind
  - Parallel to runway centre line at nominated spacing from runway.
  - Base Perpendicular to runway centre line at nominated spacing from runway threshold.
  - Approach path
  - Established on final not below 500 ft AGL. Controls rate of descent to maintain approach path to nominated aim point.
  - Maintains RWY extended centreline. Maintains nominated approach speed (not below reference speed or 1.3Vs) appropriate to prevailing wind (gust) conditions to flare height.
  - Complies with airspace requirements

- Using the VTC identify Training area boundaries.
  - Aerobatics area
  - Tooradin ALA danger area
  - CTA lower limits for a nominated position
  - FN5 areas
  - VFR approach points.
- Identify position and maintain orientation within the training area using key geographical features.
- Conducts departure procedures to the training area in accordance with prescribed procedures.
- Conducts normal and special arrival procedures from the training area in accordance with prescribed procedures.
- Conducts circuits in accordance with prescribed procedures.

Lands Aeroplane

"Demonstrate the skills and knowledge to land an aeroplane (including crosswind conditions,) perform a mishandled landing procedure and perform after landing checks." This may include but is not limited to the following:

Land an aeroplane:

- Approach path is maintained to nominated aim point.
- Landing flare is commenced at appropriate height.
- Throttle is closed.
- Rate of descent to touch down in landing attitude is controlled and balloon or bounce is controlled.
- Nose wheel is lowered without harshness.
- Touchdown occurs within 400'/120 metres of nominated point on the RWY and within 2 metres of the centre line.
- Controls are positioned to maintain control in a crosswind conditions.
- Brakes are applied without skidding.
- After landing checks are performed in accordance with approved checklist.

Perform Recovery from Missed Landing

- Situation where landing may not be successful is recognised and a go-round is commenced (includes when instructed to go-round.) Take-off power is applied.
- Aeroplane is controlled and climb is initiated.
- Flap is retracted at a safe airspeed and altitude.
- Go-round is completed in accordance with prescribed aerodrome procedures.

Execute Advanced Manoeuvres and Procedures

“Demonstrate skills and knowledge to control an aeroplane while performing advanced manoeuvres and procedures.”

This may include but is not limited to the following:

Enter and recover from a stall in the approach configuration Premanoeuvre checks are performed.

- Airspace cleared procedure is completed.
- Entry to the stall is made on a nominated heading/geographical reference at a nominated height while maintaining balance.

Approach configuration is set (to a nominated engine RPM and flap extension.)

Approach to the stall is recognised (control wheel position, attitude, airspeed, control effectiveness, slipstream noise, control buffet and stall warning horn.)   Stall is recognised, airspeed and control wheel position is noted.

- Stall recovery is initiated, full power is used to minimise height loss.
- Height loss and heading deviation are noted.
- Aeroplane is returned to nominated heading/geographical reference at a nominated height while maintaining balance.

After take-off actions are performed. (Take-off power is set and flap retracted.) Height loss is consistent with aeroplane type.

Enter and recover from a stall with a wing drop Premanoeuvre checks are performed.

- Airspace cleared procedure is completed.
- Entry to the stall is made on a nominated heading/geographical reference at a nominated height while maintaining balance.
- Approach to the stall is recognised (control wheel position, attitude, airspeed, control effectiveness, slipstream noise, control buffet and stall warning horn.)   Incipient spin is initiated using rudder.
- Incipient spin is recognised, yaw, roll, airspeed and flying control positions are noted.
- Incipient spin recovery is initiated, yaw is terminated and power is used to minimise height loss.
- Height loss and heading deviation are noted.
- Aeroplane is flown to re-establish nominated heading/geographical reference at nominated height while maintaining balance.
- After take-off actions are performed. (Take-off power is set and flap retracted.) Height loss is consistent with aeroplane type.

Turn an aeroplane steeply:

- Airspace cleared procedure is completed.

- Level steep turn is entered on a nominated heading/geographical reference at a nominated height.
- Minimum safe entry speed is established before entering steep turn.
- Steep turn is entered and maintained at 45º/60º angle of bank, maintaining height (±150 ft) and in balance (± ¼ ball.)
- Steep turn is exited on a nominated heading/ geographical reference, normally through 360º (±10º.)
- Descending steep turn is entered on a nominated heading/geographical reference at a nominated height.
- Minimum safe entry speed (Vg + the increase in magnitude of Vs at the angle of bank/load factor to be used) is established before entering descending steep turn and the aeroplane is trimmed.
- Attitude is adjusted to maintain the minimum safe airspeed (+10/-0 kt.)
- Descending steep turn is exited on a nominated heading/ geographical reference, normally through 360º (±10º) with a minimum height loss of 500 ft.
- Nose dropping or height loss is managed by reducing angle of bank, not by increasing back-pressure (load factor) on the elevator.
- Stall awareness is maintained. (Symptoms approaching the stall are recognised and stall avoidance techniques are employed to prevent the stall.)
- Spiral dive awareness is maintained. (Developing spiral dive symptoms are recognised and approved spiral dive recovery techniques are employed.)
- Aeroplane engine and airframe limitations are monitored and maintained within operating limitations.

Execute a short-field take-off and landing:

- Aeroplane is configured for short take-off (optimum flap setting.)
- Aeroplane is lined up on the runway to maximise the use of the runway available.
- Power is set before brakes are released (where potentially propeller damaging conditions do not exist.)
- Aeroplane is rotated at recommended airspeed.
- Take-off safety speed V_{TOSS} is achieved before climb out is commenced.
- Nominated climb speed is maintained until safe height is reached.
- After take-off actions are performed. (Take-off power is set and flap retracted.) Touchdown point is nominated.
- Approach to aim point is maintained at nominated airspeed to achieve touch down at nominated touchdown point (+200 ft/60 metres.)

- Braking is applied without skidding and directional control is maintained.

Manage Abnormal Situations:

"Demonstrate the skills and knowledge to accurately assess an abnormal situation and perform immediate actions, configure the aeroplane, select a landing area and land with no injury to personnel or damage to aeroplane or property, to perform a precautionary search and manage other abnormal situations." This may include but is not limited to the following:

Manage engine failure after take-off:

- Control of the aeroplane is maintained.
- Nose is lowered to achieve recommended safe/gliding speed.
- Landing area ahead of the aeroplane is selected within gliding range.
- Immediate actions are performed in accordance with approved check-list.
- Time permitting, emergency procedures, immediate actions, are performed in accordance with approved check-list.
- Time permitting, mayday transmission is simulated.
- Time permitting, emergency passenger briefing is given.

Go-round is commenced to maintain minimum safe height for VFR – at 600' AGL.

Perform forced landing (from above 2000' AGL) Control of the aeroplane is maintained.

- Speed in excess of best gliding speed is used to maintain height.
- Nose attitude is set to achieve best gliding speed.
- Aeroplane is trimmed.
- Aeroplane is balanced.
- Immediate actions are performed in accordance with approved check-list.
- Engine is managed to ensure power is available for the go-round. Carburettor heat is selected on, engine parameters are monitored and maintained within limitations. Engine is periodically warmed using throttle.
- Wind direction and speed is determined.
- A suitable landing area is identified within gliding distance.
- A plan is formulated to achieve an into wind landing on the selected landing area using a standard forced landing plan. The standard plan consists of a square circuit incorporating a high key point (2500 ft AGL on crosswind leg,) a low key point (1500 ft AGL abeam the initial aim point on downwind leg) combined with a short final which is consistent with aeroplane gliding performance and prevailing wind conditions.

- For assessment purposes, the standard plan is to be implemented by joining the formulated plan no later than mid downwind at the low key position. If this is not available a new plan is to be formulated.
- The aeroplane performance and prevailing wind conditions are monitored and the plan is modified to achieve a successful outcome in the changing environment.
- Emergency procedures are performed in accordance with approved check-list and a decision to continue with the forced landing is made if engine re-start is not achieved.
- A mayday transmission is simulated, transponder simulated with code 7700 set and ELT simulated that activation is made.
- Emergency passenger briefing is given including flight situation, brace position for landing and security of harnesses.
- Forced landing or impact checks are simulated.
- A go-round is commenced to maintain minimum safe height for VFR – at 600' AGL.

Conduct precautionary search and landing:

For the purposes of assessment during the RPL, the precautionary inspection shall be carried out at

Tooradin ALA. Test candidates are encouraged to exercise pilot responsibilities required to operate at a Non Towered Aerodromes (NTA), however, they will not be assessed on NTA procedures as part of the assessment criteria for precautionary inspection. Test Officers will offer assistance as required to facilitate the safe conduct of the simulated Precautionary Inspection.

- State flight circumstances where a precautionary search should be conducted.
- Detail decision making process in deciding to carry out a precautionary search.
- Aeroplane is configured for low level reduced visibility flight.

Low flying checks are completed before commencing descent.

- ATC is informed of pilot's intentions in a simulated PAN PAN call.
- Emergency passenger briefing is given including flight situation, brace position for landing and security of harnesses.
- Systematic search for a candidate field is commenced.
- Candidate landing area is identified.

Inspection of candidate landing area is commenced.

During the conduct of the inspection the candidate will be assessed on the following criteria.

The simulated precautionary inspection is to be carried out during the conduct of a low level (500 ft) circuit at Tooradin NTA.

- Control of the aeroplane is maintained at all times. IAS +5/-0 kt of nominated airspeed.
- Circuit pattern is established.
- Pre-landing checks are performed before each pass is made.
- Ground reference features are selected to help maintain orientation.
- Heading bug is aligned with landing direction to help maintain orientation.
- Descents below and climbs to 500 ft AGL are made in straight line flight on the nominated clear approach and take-off paths. (i.e. no climbing or descending turns.)
- Passes at 500 ft, 200 ft and 100 ft AGL are performed.
- Obstacles and hazards that may be identified on each subsequent pass are stated.
- Particular attention is paid to assessing the landing area for obstacles that create a hazard for subsequent lower passes.
- An assessment is made as to whether the candidate field is a suitable landing area.
- A short field landing is performed.
- Heading bug is aligned with landing direction to help maintain orientation.
- Descents below and climbs to 500 ft AGL are made in straight line flight on the nominated clear approach and take-off paths. (i.e. no climbing or descending turns.)
- Passes at 500 ft, 200 ft and 100 ft AGL are performed.
- Obstacles and hazards that may be identified on each subsequent pass are stated.
- Particular attention is paid to assessing the landing area for obstacles that create a hazard for subsequent lower passes.
- An assessment is made as to whether the candidate field is a suitable landing area.
- A short field landing is performed.

Manage other abnormal situation (select any one)

The abnormal situation chosen is to be selected are from Emergency procedures stated in the Aeroplane Flight Manual (AFM.) AIP or ERSA.

- Controls aircraft
- Identifies abnormal or emergency situation

Manages or rectifies abnormal or emergency situation in accordance with Flight Manual/POH, standard operating procedures or Company Operations Manual

- Performs abnormal and emergency actions in accordance with AIP procedures when applicable
- Advises ATS or other agencies capable of providing assistance of situation and intentions.

Manage fuel System

"Demonstrate skills and knowledge to determine fuel requirements and perform the necessary calculations, to refuel the aeroplane and to ensure the fuel system is configured and operated for maximum safety in the prevailing flight conditions…."

This may include but is not limited to the following:

Plan fuel requirement

- Fuel required for the flight is calculated including taxi, fixed and variable reserves.
- Allowance for possible circumstances is anticipated for and included in fuel calculation.

Manage fuel system

- Fuel quantity using two approved methods is verified. [see CAAP 234-1(1)] Correct fuel grade and its freedom from perceptible contaminants are verified.
- Fuel tank vents are inspected and found free from obstruction.
- Fuel tank caps are verified secure.
- Fuel system including auxiliary pumps, fuel cocks and fuel tank selection are managed in accordance with the Aeroplane Flight Manual.
- Fuel log is maintained.

Full instrument panel manoeuvres

"Demonstrate skills and knowledge to perform all flight manoeuvres using the full instrument panel to re-establish VFR conditions."

This may include but is not limited to the following:

Determine and monitor serviceability of flight instruments and instrument power sources.

- Determines serviceability of flight instrument, pitot/static system and instrument power sources in accordance with Flight Manual/POH before flight.
- Performs functional checks of turn, heading and attitude indicators while taxiing.
- Monitors flight instruments and instrument power sources and reacts appropriately to any warnings, unserviceability or erroneous indications.

Perform manoeuvres using full instrument panel.

- Pilots flying in simulated instrument conditions retains responsibility for maintaining a lookout and traffic separation. When instructed to turn, climb or descend the pilot flying is to confirm that it is safe to manoeuvre before doing so.
- Pilots flying should readback given instructions to minimise the possibility of communication errors.

Interprets and reacts appropriately to flight instrument indications to achieve and maintain specified flight profiles using full instrument panel.

- Sets and maintains power and attitude by reference to full instrument panel to achieve straight and level performance during normal cruise (±200 ft, ±10°, ±10 kts).
- Sets and maintains power and attitude by reference to full instrument panel to achieve nominated climb performance (±10°, ±5 kts).
- Sets and maintains power and attitude by reference to full instrument panel to achieve descent performance (±10°, ±10 kts, ±200 ft/min).

Sets and maintains power, attitude and bank during climb, descent and level flight by reference to full instrument panel to achieve rate one turns onto a nominated heading (±10° on exit).

- Balances aeroplane.
- Trims aeroplane.

Recover from unusual attitudes

- Identifies uncontrolled flight involving high and low nose attitudes, varying angles of bank and power settings and unbalanced flight and resumes controlled flight. Re-establish flight by visual reference
- Performs or simulates involuntary transition from visual flight conditions to instrument meteorological conditions (IMC), identifies loss of visual reference and manoeuvres aeroplane to re-establish VMC (Visual Meteorological Conditions).
- Develops a plan that ensures re-establishment of VMC.

Manage passengers and cargo

“Demonstrate skills and knowledge to ensure that passengers are informed, controlled and that provision has been made for their comfort and well being, and that cargo is managed in accordance with regulations.”
This may include but is not limited to the following:

Brief passengers.

- Briefs passengers before flight and in emergencies in accordance with the CASRs, and company operations manual.
- Explains and confirms conduct and procedures to avoid contact of personnel or articles with propellers, rotor blades or jet blast.
- Explains procedures to avoid interference with flight controls when applicable.
- Explains and demonstrates the use of seat belts/safety harness.

- Explains and demonstrates use of escape hatches, exits and emergency equipment.

Aid and assist passengers.

- Establishes and maintains clear communications with passengers.

Provides passenger comfort and well-being within the limits of aircraft safety, controls passengers on the ground and in the air in accordance with CASRs, occupational health and safety requirements and operations manual.

Manage cargo.

- Manages loading, unloading and security of cargo throughout flight operations.
- Identifies dangerous goods and applies procedures to ensure safety and security.

31.6.1 Airmanship

Maintain situational awareness.

- Monitors all aircraft systems using a systematic scan technique.
- Collects information to facilitate ongoing system management.
- Monitors flight environment for deviations from planned operations.
- Collects flight environment information to update planned operations.

Aeroplane operated within engine and airframe limitations.

- Scan of engine instruments is maintained.
- Instrument indications are reacted to and action is taken to maintain indications within limitations.

Lookout and traffic separation is maintained.

- Maintains lookout and traffic separation using a systematic scan technique at a rate determined by traffic density, visibility and terrain.
- During climbing flight the nose is lowered each 500 ft to ensure the area is clear of conflicting traffic to safely continue climbing.
- Maintains radio listening watch and interprets transmissions to determine traffic location and intentions of traffic.
- Performs airspace-cleared procedure before commencing any manoeuvres.
- Traffic information that is passed to a pilot by ATC which is not sighted is reported as being not sighted.

Visual Meteorological Conditions are maintained.

- Look-out is maintained.
- VMC criteria for all types of airspace is stated.
- Action is taken to maintain VMC.

- Conditions requiring Special VFR are recognised and special VFR requested as required.

Operational decisions are made promptly and correctly.

Assesses situations and makes decisions.

- Identifies problems.

Analyses problems.

- Identifies solutions.
- Assesses solutions and risks.
- Decides on a course of action.
- Communicates plans of action - if appropriate.
- Allocates tasks for action – if appropriate.

Takes actions to achieve optimum outcomes for the operation.

- Monitors progress against plan.
- Re evaluates plan to achieve optimum outcomes.

Sets priorities and manages tasks.

- Organises workload and priorities to ensure completion of all tasks relevant to the safety of the flight.
- Puts the safe and effective operation of the aircraft ahead of competing priorities and demands.
- Plans events and tasks to occur sequentially.
- Anticipates critical events and tasks to ensure completion.
- Uses technology to reduce workload and improve cognitive and manipulative activities.
- Avoids fixation on single actions, tasks or functions.

Potentially unsafe situations are recognised and recovered from.
Recognise and manage threats

- Identifies relevant environmental or operational threats that are likely to affect the safety of the flight.
- Develops and implements countermeasures to manage threats.
- Monitors and assesses flight progress to ensure a safe outcome; or modifies actions when a safe outcome is not assured. Recognise and manage errors
- Applies checklists and standard operating procedures to prevent aircraft handling, procedural or communication errors and identifies committed errors before safety is affected or aircraft enters an undesired aircraft state.
- Monitor aircraft systems, flight environment and crewmembers, collects and analyses information to identify potential or actual errors.

- Implements countermeasures to prevent errors or takes action in the time available to correct errors before the aircraft enters an undesired aircraft state.

Recognise and manage undesired aircraft state Recognises undesired aircraft state.

- Prioritises tasks to ensure management of undesired aircraft state.
- Manipulates aircraft controls or systems, or modifies actions or procedures to maintain control of the aircraft and return to normal flight operations, in the time available.

Table 31-2 RPL with Radio Endorsement – Instructor/Student Guide

TRG SESSION #	TRAINING SESSION DESCRIPTION	DUAL	SOLO	PROG DUAL	PROG SOLO	I.F.	PROG I.F.	TOTAL PROG FLIGHT TIME
RPL(A)1	Effects of Controls	1.0		1.0				1.0
RPL(A)2	Straight & Level	1.0		2.0				2.0
RPL(A)3	Climbing & Descending	1.0		3.0				3.0
RPL(A)4	Turning	1.0		4.0				4.0
RPL(A)5	Stalling	1.0		5.0				5.0
RPL(A)6	Circuit Introduction	1.0		6.0				6.0
RPL(A)7	Circuits	1.0		7.0				7.0
RPL(A)8	Circuits – Flapless & Missed Approach	1.0		8.0				8.0
RPL(A)9	Circuit Emergencies	1.0		9.0				9.0
RPL(A)10	Circuits - Pre-solo assessment	0.7		9.7				9.7
RPL(A)11	Circuit – First solo		0.3		0.3			10.0
RPL(A)12	Circuit Consolidation	0.7		10.4				10.7
RPL(A)13	Circuits – solo		0.7		1.0			11.4
RPL(A)14	Circuit Consolidation	0.7		11.1				12.1
RPL(A)15	Circuits – solo		1.0		2.0			13.1
RPL(A)16	Advanced Stalling	1.0		12.1				14.1

TRG SESSION #	TRAINING SESSION DESCRIPTION	DUAL	SOLO	PROG DUAL	PROG SOLO	I.F.	PROG I.F.	TOTAL PROG FLIGHT TIME
RPL(A)17	Forced Landings	1.2		13.3				15.3
RPL(A)18	Steep Turns	1.0		14.3				16.3
RPL(A)19	Crosswind circuits	1.0		15.3				17.3
RPL(A)20	Pre-training area solo assessment	1.2		16.5				18.5
RPL(A)21	First training area solo		1.0		3.0			19.5
RPL(A)22	Circuits – Short Field T/O & Landing	1.0		17.5				20.5
RPL(A)23	Consolidation	1.0		18.5				21.5
RPL(A)24	Precautionary Search & Landing	1.2		19.7				22.7
RPL(A)25	Subsequent T/A Solo		1.0		4.0			23.7
RPL(A)26	Basic Instrument Flight	1.0		20.7		0.6	0.6	24.7
RPL(A)27	Consolidation	1.0		21.7		0.2	0.8	25.7
RPL(A)28	Consolidation	1.3		23.0		0.2	1.0	27.0
RPL(A)29	Solo Consolidation		1.0		5.0			28.0
RPL(A)30	Pre-licence assessment	1.3		24.3		0.2	1.2	29.3
RPL Aeroplane Category Rating Flight Test		**1.3**		**25.6**	**5.0**	**0.2**	**1.4**	**30.6**

This section should serve as a quick reference guide by both APTA Instructors and Students when preparing for any flight lesson listed below as extracted from the relevant Lesson Plans stored in Flight School Manager (RPL syllabus).

The Pre-flight briefing, Core flight sequences, and Post flight de-brief notes below itemizes the minimum content to be conducted in each flight lesson to maximize effective delivery of instruction and learning by both crew members.

Pre-flight briefing content

1. Review flight sequences, what to expect, see & do

2. Check essential knowledge
3. Reinforce threat & error management
4. Reinforce significant airmanship points

Core flight sequences content

1. Effects of Controls
   - Introduction to manoeuvring the aeroplane on the ground and in flight
   - Attitude flying
   - Primary & secondary effect of controls
   - Effect of power, slipstream, airspeed, undercarriage (if retractable), flap & trim Operation of ancillary controls
2. Straight and Level
   - Establish and maintain straight & level flight
   - Straight flight - reference point/heading, wings level, aeroplane in balance
   - Level flight – attitude, trim
   - Power + Attitude+ Configuration = Performance
   - Straight & level at various airspeeds, power settings and configurations:
     - Normal, fast, slow & precautionary (flaps) cruise
3. Climbing and Descending
   - Establish and maintain various types of climb and descent
   - Entry & levelling off sequence
   - Normal (cruise), best rate (V_Y) and best angle (V_X) climbs
   - Effect of undercarriage (if retractable), flap and power on the climb
   - Cruise, glide and approach descents
     - Effect of wind, undercarriage (if retractable), flap and power on the glide
4. Turning
   - Adverse yaw demonstration
   - Medium level turns
   - Climbing turns
   - Descending turns (glide and powered)
   - Introduction to spiral dive recovery (demonstration only)
5. Stalling
   - Checklist procedures (e.g. HASELL)
   - Slow flight
   - Symptoms and recognition of an imminent stall
   - Symptoms and recognition of a fully developed stall

- Recovery technique
- Effect of power on recovery
- Effect of power, undercarriage (if retractable) and flap on the stall
- Landing configuration stall
- Wing drop recovery
- Incipient spin recovery (demonstration only)
- Assess stall recovery technique (basic)

6. Circuit Introduction
   - Slow flight and stalling (basic) assessment – training area
   - Circuit introduction:
     - Normal take-off
     - Standard circuit
     - Normal approach
     - Normal landing
7. Circuits
   - Revise and consolidate normal circuits
8. Circuits – Flapless & Missed Approach
   - Circuit consolidation
   - Flapless approach and landings
   - Missed approach procedure
   - Missed landing recovery
9. Circuit Emergencies
   - Circuit consolidation
   - Flapless approach and landing consolidation
   - Missed approach consolidation
   - Missed landing recovery consolidation
   - Recognition of take-off abnormalities, rejected take-off
   - Engine failure after take-off
   - Engine failure in the circuit
   - Glide approach and landing
10. Circuits - Pre-solo assessment
    - Consolidate and assess circuits, including missed approach, missed landing and circuit emergency procedures

Prior to commencing this training session, confirm the following first solo prerequisites have been met:

- Theory examination – the trainee has successfully completed the pre-solo examination
- Knowledge deficiency report – areas of deficiency identified in the pre-solo examination KDR have been satisfactorily reassessed
- Underpinning knowledge – the trainee's understanding of previously introduced underpinning knowledge has been assessed
- English language assessment – the trainee has either:
- been assessed as meeting the general English language proficiency standard mentioned in the

Part 61 MOS; or

- has completed an approved course of training in English language proficiency - Medical – the trainee holds a minimum of:
- a current recreational aviation medical practitioner's certificate; or
- a current Class 2 medical certificate

11. Circuit – First solo
    - One solo circuit in accordance with the limitations and guidelines advised by the authorising flight instructor
    - Flight instructor to observe the entire circuit and landing
12. Circuit Consolidation
    - Revise and consolidate circuits
    - Confirm performance standard maintained for subsequent solo circuits
13. Circuits – solo
    - Solo circuits in accordance with the limitations and guidelines advised by the authorising flight instructor
14. Circuit Consolidation
    - Revise and consolidate circuits, including engine failure after take-off and in the circuit area
    - Confirm performance standard maintained for subsequent solo circuits
15. Circuits – solo
    - Solo circuits in accordance with the limitations and guidelines advised by the authorising flight instructor
16. Advanced Stalling
    - Recognition and recovery from unusual attitudes (nose-high)
    - Climbing stall
    - Descending stall
    - Turning stalls – from level flight, climb and descent (approach configuration and glide)
    - Incipient spin recovery – from straight and level, climbing and turning
    - Advanced stalling and incipient spin recovery assessment
    - Circuit departure and arrival procedures

17. Forced Landings
    - Practice forced landings (simulated complete and partial engine failure conditions)
    - Manage other simulated abnormal situations
    - Circuit departure and arrival procedures
    - Passenger management
    - Radio failure procedures inbound from the training area
18. Steep Turns
    - 45º angle of bank level turns
    - Maximum rate turns – 60º angle of bank
    - Minimum radius turns – 60º angle of bank
    - Steep gliding turn
    - Spiral dive recognition and recovery
    - Sideslipping (where flight manual permits)
    - Practice forced landing
    - Radio failure procedure (inbound from training area)
    - Flapless approach and landing
19. Crosswind circuits
    - Crosswind circuits
    - Flapless approach and landing – review and assess
    - Review missed approach and recovery from missed landing
    - Review engine failure after take-off and in the circuit area
    - Assess crosswind take-off and landing
20. Pre-training area solo assessment
    - Practice forced landing
    - Steep turns
    - Sideslip (where flight manual permits)
    - Advanced stalls
    - Unusual attitude recoveries
    - Radio failure procedure (inbound from training area)
21. First training area solo
    - Perform practice forced landings solo, in accordance with the limitations and guidelines advised by the authorising flight instructor

      *(During solo flight, trainees must only be authorised to practise sequences that have previously been assessed to performance standard appropriate for the exercise and training phase)
22. Circuits – Short Field T/O & Landing
    - Circuits - short field take-off and landing
    - Revise circuit emergencies
23. Consolidation

- Short take-off and landing
- Circuit emergencies
- Practice forced landing
- Advanced stalls
- Steep turns
- Sideslipping
- Unusual attitude recoveries

24. Precautionary Search & Landing
    - Short take-off and landing
    - Precautionary search & landing (simulated)
    - Best endurance performance
25. Subsequent T/A Solo
    - Practice forced landing
    - Basic stalls, entry from straight & level without power applied
    - Steep level turns
    - In accordance with the limitations and guidelines advised by the authorising flight instructor

    *(During solo flight, trainees must only be authorised to practise sequences that have previously been assessed to performance standard appropriate for the exercise and training phase)
26. Basic Instrument Flight
    - Basic instrument flight
    - Unusual attitude recoveries
    - Actions upon inadvertent entry into IMC
27. Consolidation
    - Training area consolidation and assessment
28. Consolidation
    - Consolidation and assessment – circuits & training area
29. Solo Consolidation
    - Short field take-off
    - Practice forced landing
    - Basic stalls
    - Steep level turns
    - Short field landing
    - In accordance with the limitations and guidelines advised by the authorising flight instructor

    *(During solo flight, trainees must only be authorised to practise sequences that have previously been assessed to at least performance standard appropriate for the exercise and training phase)
30. Pre-licence assessment

– Consolidation and assessment – circuits & training area

31.6.2 De-Brief Content

1. Training review and outcomes achieved against lesson objectives and the Part 61 MOS competency standards
2. Recommendations for next lesson (including any carryover/remedial training)
3. Trainee preparation for next lesson
4. Training record completion & sign off

***For lesson 30 Pre-license assessment.**

- Training review and outcomes achieved against lesson objectives and the Part 61 MOS competency standards
- Recommendations for next lesson if required (including any carryover/remedial training)
- Ensure trainee meets minimum requirements for issue of RPL (A) licence and flight radio endorsement
- Trainee preparation for flight test
- Training record completion & sign off
- Recreational Pilot Licence (Aeroplane) Competency Achievement Record completion & sign
- off
- Flight test certification (CASR 61.235)

32 Auto Pilot (AP) Awareness

32.1 Introduction

Pilot's must be awre of:

1. The possibilty of inadvertant engagement of the AP.
2. Aircraft control responses with the AP engaged.
3. How to disconnect the AP.

32.2 (1) Inadvertent Engagement of the Auto Pilot

The KAP 140 controls are located immediately above the end of the engine throttle's range of movement in the Cessna 172. The AP connect button lies within reach of a Pilot's finger, thumb or knuckle while holding the throttle in the fully open position. It is possible for the AP to be engaged when the throttle is fully openned by a Crew Member. Should this occur, a Single Axis KAP 140 will engage in Roll Mode and the Two Axis version will engage in Roll and Vertical Speed Mode.

There is limited indication to the Crew that the KAP 140 is engaged. Indication that the AP is engaged is onlt displayed on the control unit which is located at the bottom of the avionics suite, a position normally out of the line of sight of both Crew. There are no aural or other visual indications that the AP is engaged.

32.3 (2) Aircraft Control Responses with the AP Engaged

Cessna 172s operated by APTA's MFT Base are fitted with a KAP 140 Single Axis Auto Pilot. The Cessna 172 operated by APTA's BAC Base is fitted with a Two Axis Auto Pilot.

Activation of a Single Axis Auto Pilot (AP) engages Roll Mode which functions as a wing leveller. In this mode, the AP responds to heading changes and commands the ailerons to counter this by rolling opposite to the sensed heading change to stop the turn. Should a Pilot attempt to override the AP in flight with control inputs, the AP will command aileron inputs to counter the Pilot's control movement. The AP system provides control inputs that may be overridden by a Pilot as a safety measure. Attempting to manipulate the ailerons in flight with the AP in Roll Mode may be snesed by the Pilot as 'stiff' or 'heavy' controls.

Activation of a Two Axis Auto Pilot (AP) engages Roll Mode and Vertical Speed Mode. In Vertical Speed Mode, the AP will adjust and hold the aircraft pitch attitude to maintain the vertical speed the moment the AP was engaged. The AP responds to changes in vertical speed and commands the elevator to adjust pitch attitude to achieve the set vertical speed. The AP system provides control inputs that may be overridden by a Pilot as a safety measure; however, if the AP pitch change mechanism is not powerful enough to reset the pitch attitude, it commands the elevator trim control to relieve the control force to do so. Should a Pilot attempt to override the AP in flight with control elevator inputs, the AP will initially command elevator inputs to counter the Pilot's control movement. With sustained elevator control input the AP will command elevator trim movement in an attempt to achieve the set vertical speed. As a safety feature, if the AP commands elevator trim movement for more than 5 seconds an aural caution will announce “PITCH IN MOTION”. If the AP commands elevator trim movement for more than approximately 20 seconds, an aural warning will announce “CHECK PITCH TRIM” and the red PITCH TRIM annunciator will illuminate. Attempting to manipulate the elvator in flight with the AP in Vertical Speed Mode may initially be sensed by the Pilot as ‘stiff’ or ‘heavy’ controls leading to potentially VERY heavy control input(s) to maintain attitude, aural cautions, followed by aural warnings and visual annunciation.

With the KAP 140 engaged in Roll Mode while taxiing, the AP will respond to turns on the ground by commanding the opposite aileron movement until the turn is stopped. Apparently spontaneous movement of the ailerons while taxiing is indicative of the AP being engaged.

32.4 (3) How to Disconnect the AP

Should a Pilot experience control difficulties suspecting that the AP is engaged, press and hold the AP disconnect button on the left control column yoke, regain safe control of the aircraft, trim and ensure the AP is disconnected.

The AP may be disconnected by:

1. Pressing and holding the AP disconnect button on the left control column yoke.
2. Pressing the power button on the AP control panel.
3. Pulling the AP circuit breaker (if available).
4. Switching off the Avionics Master Switch.
5. Switching off the Battery Master Switch.

32.4.1 Safe Operation of Aircraft with Auto Pilot Fitted

1. Ensure all mandatory AP pre-flight checks are performed before take-off.
2. Ensure the AP is off/not engaged before take-off by depressing the AP control yoke disconnect button as part of the pre-take-off checks.
3. Ensure the AP is off/not engaged before landing by depressing the AP control yoke disconnect button as part of the pre-landing checks.
4. Remain attentive to inadvertant engagement of the AP in flight. Maintain Situational Awareness and know the procedures for how to disconnect the AP.

32.5 Further Information and Reading

Information on the operation, limitations, cautions and emergency procedures for the KAP 140 Auto Pilot may be obtained from Supplement 7 in Section 9 of the Aircraft Flight Manual (AFM) and the Bendix/King KAP 140 Auto Pilot System – Pilot's Guide.

Contact your Base Safety Officer (BSO) for further information on the hazard associated with KAP 140 Auto Pilot(s), assistance and understanding the system and instruction on how to use the system safely.

Australian Transport Safety Bureau (ATSB) safety investigation report:

Collision with terrain involving Cessna 172, VH-ZEW, near Millbrook, Victoria on 8 September 2015 – the ATSB's final report on a fatal accident where pilot control manipulation with the Auto Flight System engaged was found to be the likely cause of the collision with terrain.

http://www.atsb.gov.au/publications/investigation_reports/2015/aair/ao-2015-105/

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33 SUPPLEMENT – Safety Advisory

33.1 Pre-Flight Inspections

The purpose of this Safety Advisory is to inform pilots of their responsibilities as Pilot in Command and the safety precautions that are required to be exercised before flight. A pre-flight checklist and visual aid to pre-flight inspection will accompany this article. Human Performance Factors, and, Threat and Error Management will be considered. It has been prompted by incidents that have occurred on flights authorised by APTA and that have been observed on flights authorised by other operators at Moorabbin Airport.

The purpose of the pre-flight inspection is to ensure that the aircraft is safe for flight in all respects. It includes: removal of locking devices, security of external openings and to ensure the aircraft carries necessary equipment, fuel and engine oil. It is last opportunity for the Pilot in Command to inspect the aircraft for defects that may have occurred subsequent to the Daily Inspection and that have not have been recorded on the Maintenance Release.

APTA's Safety Management System has recorded the following incidents involving pre-flight inspections:

- An aeroplane took-off with the pitot cover in place resulting in a zero indication on the airspeed indicator for the duration of the flight.
- A flight was conducted with a fuel cap not secured resulting in the loss of 60 litres of fuel in a flight of one hour.
- A Cessna 152 and a Cessna 172 taxied for take-off with their rudder gust lock not removed before being alerted to the error by ground and tower personnel.
- A Piper Warrior returned for landing when ropes were observed trailing from the underwing tie down loops. The tie-down ropes broke free from the ground attachment points at the commencement of taxiing.
- On two occasions, taxiing Piper Warriors were alerted by other parties that they were trailing tie-down equipment.
- On two occasions flights were commenced with the oil dip stick left on the ground where the pre-flight inspection was performed.
- A Piper Warrior was started-up for a flight with fuel streaming from the fuel strainer/gascolator drain fitting before being alerted to shut down by a passing pilot. This resulted in the loss of 10 litres of fuel in a few minutes.
- An aeroplane was shut down immediately after start up when the pilot noted that the oil pressure remained at zero. The oil had not been replenished after it had been drained during maintenance.

- A pilot had to shut down the engine during the initial taxi when the toe-brakes became jammed by a foreign object left by maintenance personnel.
- An aeroplane was flown on 5 separate days with the forward cowling securing screws missing as a result of a maintenance oversight. This resulted in damage to the cowling and had the potential for the cowling to separate and detach in flight.
- A Piper Warrior returned from flight with 3 of the cowling latches incorrectly fastened and the remaining one unfastened.
- A Piper Warrior aborted its take-off aborted when the airspeed indicator showed zero. The pitot cover had not been removed before flight. The pitot cover visibility device had been incorrectly attached to the stall warner vane and was not visible to the pilot!
- A Staff Instructor was observed, and later acknowledged, conducting a flight (a navigation exercise) without checking whether there was sufficient fuel, engine oil or coolant; or whether all filler caps were securely fastened.

APTA's Safety Management System is aware of the following recent incidents relating to the pre-flight inspections of other operator's aircraft:

- A Cessna 152 having reported ready at the holding point for the runway was alerted that the rudder gust lock had not been removed.
- A Cessna 152 took-off with the rudder gust lock not removed.
- An Aero-Commander took-off with the aeroplanes "chock-lock" attached to the nose wheel.
- A Piper Warrior was observed with the cargo door fully open on approach to land.
- Two aeroplanes were forced to land (crash) due to fuel exhaustion when the pilots failed to observe that they had sufficient quantity of fuel on board for the flight.

33.2 Review of Regulations

- CAR 138 Pilot to comply with requirements etc of aircraft's flight manual etc
- CAR 233 Responsibilities of pilot on command before flight
- CAR 234 Fuel requirements
- CAR 242 Testing of radio apparatus
- CAR 244 Safety precautions before take-off
- CAR 245 Tests before and during the take-off run
- CAO 20.2 Air service operations-safety precautions before flight
- CAO Civil Aviation Order 20.9 - Air service operations - Precautions in refuelling, engine and ground radar operations

33.3 Other references

- The Aircraft Flight Manual for the aeroplane being prepared for flight
- APTA's Operations Manual

The pre-flight checks must include those items: required by Civil Aviation Safety regulations, required by APTA's Operations Manual, stated in the Aircraft Flight Manual and any additional items to ensure the safety of the flight.

33.4 Guidelines to Performing the Pre-Flight Inspection

The pre-flight inspection should occur immediately before to the Pilot in Command boards the aircraft for flight. The pre-flight inspection may occur in conjunction with the daily inspection.

33.4.1 Fuel System Inspection and Fuel Quantity Measurement

Ensure that the minimum fuel required for the flight (and maximum with reference to weight and balance limitations) is on board and available for the flight. Approved methods to determine the fuel quantity on board are:

- Visually. The level of fuel in the tanks is observed to be full or to fuel filler indicators or tabs.
- Calibrated fuel gauges. With the aircraft on reasonably level ground the quantity of fuel may be determined with the use the fuel calibration card.
- Fuel consumed at a determined rate from a previously known quantity is calculated. Actual fuel consumed against flight time may be reconciled with planned fuel consumption rates (Block figures.)

A fuel drain test is performed on the first flight of the day and after each refuelling. A quantity of fuel is drained from each tank and from critical points (specified in the AFM) in the fuel system to visually test for the presence of water and its colour for grade. An odour test may be performed to check for contaminants (Primarily AVTUR.)

33.4.2 Ensure that Fuel Caps are Secure.

Check fuel tank vents are free from obstruction (ice, frost and insect infestation.)

33.4.3 Oil Quantity Sufficient

The pilot in command must ensure that sufficient oil (and other consumables) are available for the proposed flight. Actual oil consumed against flight time obtained from the Maintenance Release should be used when planning minimum oil levels for flights. APTA prescribes operating oil levels greater than those recommended by the manufacturer (See APTA minimum oil quantities). Ensure oil dipsticks and caps are re-secured before flight. Do not place dipsticks on the ground to prevent contamination of the engine oil with harmful grit. When replenishing oil, Safety@APTA recommends that the dipstick remain in the filler neck. Loosen the oil dipstick and withdraw sufficiently to insert the disposable oil funnel. Pour the oil through the funnel with the dipstick in situ.

33.4.4 Removal of Control Locks and Safety Devices

Ensure that the following have been removed and safely stowed or secured before start-up:

- Control locks
- Aircraft security devices
- Pitot covers
- Cowling bungs
- Windscreen covers, internal and external
- Tail stands
- Tow bars
- Boarding equipment
- Ground tie down ropes and chains
- Wheel chocks and chock-locks

33.4.5 Removal of Frost and Ice

The pilot in command is to ensure that all external surfaces are completely free from frost and ice.

33.4.6 Inspection of Flight Controls

When an aircraft's controls have been left un-secured in winds exceeding 35kt the control system is required to be inspected for damage by the pilot in command or an appropriately licenced maintenance engineer. Consideration should be given possibility that the aircraft may have been subject to propeller slipstream, helicopter down wash or jet blast exceeding 35kt.

Immediately before taxiing for take-off, the pilot in command shall test the flight controls for full and free movement and are correctly functioning.

33.4.7 Security of Safety Harnesses on Unoccupied Control Seats

The pilot in command must ensure that safety harnesses on unoccupied control and passenger seats are secured in such a fashion to prevent interference with flight controls. Ensure loose articles are restrained to prevent the aircraft's controls from being fouled.

33.4.8 Pilot In Command to ensure that the Aeroplane is Fitted with Instruments Required for the Flight

The pilot in command must ensure that the aircraft is fitted with equipment required for the category of flight. For example; a turn co-ordinator is not required for a private flight however it is required for an AIRWORK flight.

In addition to this, the pilot in command must ensure that flight and engine instruments are functioning correctly before and during the take-off run.

33.4.9 Required Equipment is Fitted or Carried and Appropriately Secured

The pilot in command must ensure that equipment required for the flight is serviceable and is fitted or carried on board for the flight. Required equipment may include:

- ELT
- Life jackets
- Emergency equipment
- Communication radios
- Radio navigation aids
- Aircraft internal and external lighting
- Current navigation charts, documents and equipment

In addition to this, the pilot in command must ensure that radio equipment fitted to the aircraft is functioning correctly.

33.4.10 Security of Doors and Hatches

Immediately before taxi the pilot in command must ensure that all doors and hatches are secured.

Hatches may include: cargo, emergency, oil and inspection hatches.

Documents Required to be Carried on Board:

- Flight Crew Licences
- Flight Crew Medical Certificates
- Photo ID
- Aeroplane Flight Manual
- Maintenance Release
- Aircraft Checklist(s)

33.4.11 PIC to Ensure that the Aeroplane is Safe to Fly in all Respects

The pilot in command must carry out an inspection on the aircraft to ensure that it is safe for the planned flight. This inspection should include checking for un-reported defects and damage that may have occurred since last flown. Examples of damage that may have occurred without the previous pilot's knowledge may include: propeller stone chips, flight control damage from strong wind, lighting failures, tyre damage and parking incidents. The windscreen should be inspected for cleanliness and cleaned as required.

33.4.12 Suitable for Position for Start Up and Taxi

The pilot in command must ensure that the aircraft is in a safe and suitable position for start up and taxi. Assessment of whether the aircraft may be safely started should include the minimum distance an aircraft engine may be operated from objects stated in CAO 20.9, 5.1.4 and that the propeller area is free from loose stones and long grass.

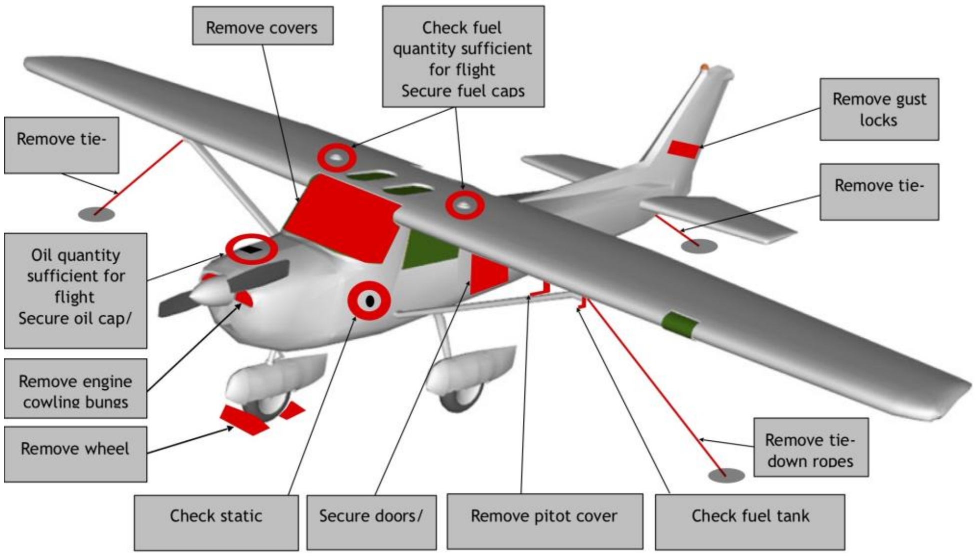
33.4.13 Threat and Error Management, Human Performance Factors and Airmanship

Table 33-1 TEM, Human Perf. Factors and Airmanship

Threat / Error / Human Performance (Hazard)	Management (Airmanship)
• Interruption of pre-flight inspection due to distraction (passengers/refueling operations) • Interruption of pre-flight inspection due to distraction (passengers/refueling operations) cont.	• Use of checklists • Use of visual aids • Consistent flow checks/routine 2.4 NTS1.4 – Set priorities and manage tasks (a) organize workload and priorities to ensure optimum outcome of the flight; (b) plan events and tasks to occur sequentially; (c anticipate events and tasks to ensure sufficient opportunity for completion; (d) use technology to reduce workload and improve cognitive and manipulative activities. 2.1 NTS2.1 – Recognize and manage threats (a) identify relevant environmental or operational threats that are likely to affect the safety of the flight;
• Items omitted (forgotten)	• Use of checklists • Use of visual aids • Consistent flow checks/routine 2.2 NTS2.2 – Recognize and manage errors (a) apply checklists and standard operating procedures to prevent aircraft handling, procedural or communication errors;

<table>
<tr><th>Threat / Error / Human Performance (Hazard)</th><th>Management (Airmanship)</th></tr>
<tr><td>Items omitted (Haste due to delayed departure)</td><td>Diligence and discipline
Delay departure
2.1 NTS2.1 – Recognize and manage threats
(a) identify relevant environmental or operational threats that are likely to affect the safety of the flight;
(b identify when competing priorities and demands may represent a threat to the safety of the flight;</td></tr>
<tr><td>Defects not observed</td><td>Inspection philosophy should be to find defects rather than a serviceable aircraft
2.2 NTS1.2 – Maintain situational awareness</td></tr>
</table>

Figure 33-1 Visual Aid to Pre-Flight Inspection – External Checks



- Check that all external aircraft surfaces are completely free from frost, ice and damage
- Check that external lighting is serviceable
- Check that the aeroplane is in a suitable position to start up and taxi

Internal Inspection

- Check that required equipment is on board and correctly stowed
- Check that required documents are on board
- Check that required instruments and equipment are fitted
- Check that unoccupied seats have their seatbelts restrained
- Check that loose articles are correctly stowed and secure

Immediately before taxiing for take-off and during take-off:

- Check that radio equipment to be used is functioning correctly
- Check the flight controls for full and free movement

Check that instruments and engine indicators are correctly functioning