EXERCISE 5

TAXYING

Introduction

1. In this exercise you will be taught to taxy the aircraft. This means to manoeuvre the aircraft on the ground under its own power. There are many and variable factors that affect an aircraft when taxying. Your instructor will show you how to deal with each situation as it arises, rather than follow any set sequence. You will be taught taxying and will be allowed to practise on each sortie until you become proficient.

GENERAL CONSIDERATIONS

Inertia and Momentum

2. As with any mass, an aircraft has the properties of inertia and momentum and will resist any attempt to change its state of rest or of uniform motion. Therefore, more power is required to start an aircraft moving from rest than to keep it moving. A moving aircraft tends to travel in a straight line (depending on the wind) and at the same speed (depending on the surface); it will resist any changes in either speed or direction of travel. Because of this, any changes in speed or direction will take time and intended changes must be anticipated.

3. There are three other important points to be considered:

a. The centre of gravity (CG) of a Firefly is forward of the main wheels. This makes the aircraft stable directionally and loath to turn. Unless the turning force is maintained during a turn, the aircraft will stop turning.

b. Excessive use of power or brake will cause a nose-down pitching movement.

c. The control column must be held in the neutral position, otherwise a strong wind acting on the elevators could produce a nose-up or nose-down pitching movement.

Speed of Taxying

4. Ideally, the speed at which an aircraft is taxied should remain constant. The factors affecting taxying speed are:

a. Surface gradient.

b. Nature of surface.

c. Wind velocity.

d. Power used.

To keep the speed constant, the pilot must consider the nature and gradient of the surface and the wind velocity; he must anticipate their effects and adjust power accordingly.

Direction of Taxying - Effect of wind

5. The effect of wind on an aircraft's taxying speed has been mentioned in para 4. A strong crosswind will also affect the control of direction when taxying (Fig 5.1). Because of this, it is slightly more difficult to turn an aircraft downwind than it is to turn it into wind.

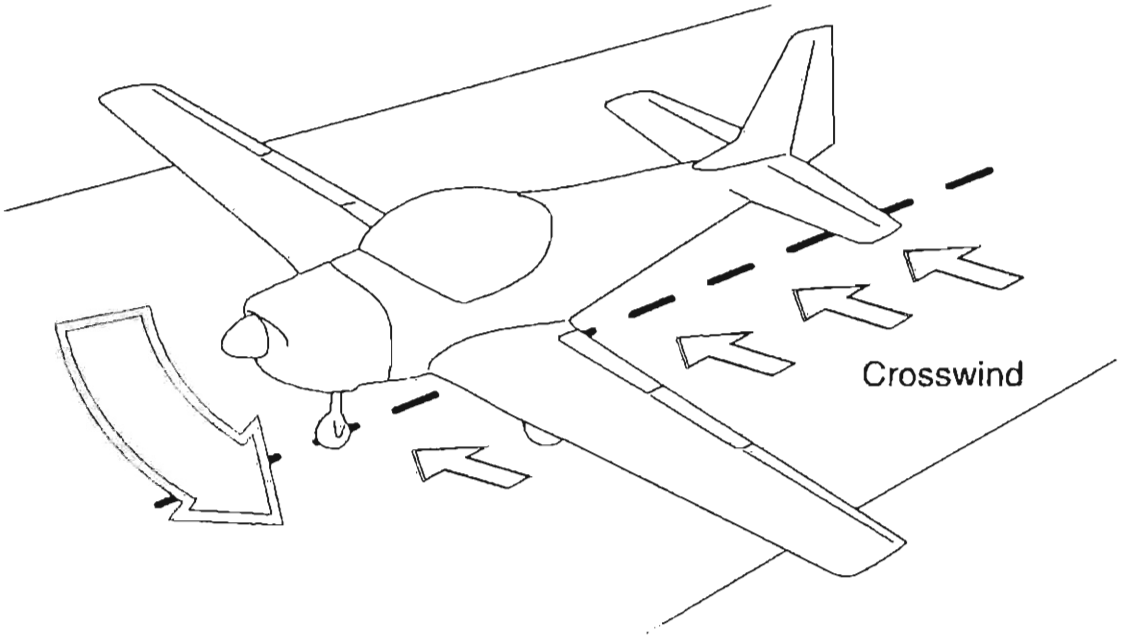

Fig 5.1 Weathercock Tendency of an Aircraft

Use of Controls

6. The controls used during taxying are the throttle, the rudder pedals and the brakes. These are used as follows:

a. **Throttle**. To vary power, throttle movement must be made smoothly. The aim is to use the minimum power necessary to obtain the correct speed. Because of the time lag between throttle movement and aircraft response, the power requirements must be anticipated.

b. **Rudder pedals**. The rudder pedals are directly linked to the nosewheel leg and the aircraft is steered on the ground by moving the rudder to left or right. The rudder pedals are not to be moved when the aircraft is stationary.

c. **Brakes**. The disc brakes on each main wheel are hydraulically operated by separate toe pedals above the rudder pedals. The brakes are independent of the nosewheel steering. Taxying speed is controlled by power and the brakes. Direction and turning is normally controlled by the nosewheel steering but differential braking can be used in conjunction with full nosewheel steering to tighten a turn. Do not use differential braking alone to turn because this will lead to excessive side loads on the nosewheel tyre and leg. The parking brake lever simply holds the toe brakes on, it does not connect directly to the brakes. To apply the parking brake, press the toe brake pedals and then set the parking brake lever to on. Before releasing the parking brake, ensure that the toe brakes are covered to avoid moving forward inadvertently.

Note: Excessive braking can cause overheating of the brakes and this, in turn, can lead to brake fade. Taxying through pools of water will also reduce brake effectiveness.

AIRMANSHIP

RT Clearance

7 Before any aircraft is allowed to taxy from dispersal, the pilot must obtain clearance from Air Traffic Control (ATC).

Lookout

8. When approaching the aircraft before flight, check that the ground immediately in front of the aircraft is clear of obstructions and that it is suitable to take the weight of the aircraft. When taxying, remember that the wing tips have a limited clearance above the ground and that the bulk of the fuselage is behind the cockpit. It is particularly important to remember these points when manoeuvring in the dispersal area where other aircraft, personnel and ground equipment are in close proximity.

9. The captain of an aircraft is responsible for the safety of his aircraft. Even when manoeuvring with the assistance of a marshaller it is still the pilot's responsibility to ensure that there is adequate clearance for his aircraft and that the propeller slipstream does not damage other aircraft or equipment, or cause danger to personnel. If you are taxying unaided and are in any doubt:

a. Stop.

b. Sunmon assistance; if none is available, contact ATC.

c. Satisfy yourself that the problem is understood.

d. Make sure that you are, in fact, clear to proceed.

Right of Way

10. Taxying aircraft have right of way over vehicles and pedestrians but not over aircraft being towed. With converging aircraft there are no hard and fast rules. In general, aircraft returning to dispersal after landing give way to aircraft taxying to the take-off point. It is not normal to overtake an aircraft taxying in front of you; if in any doubt, seek ATC assistance. For obvious reasons, a good lookout is necessary when taxying across a runway, if the runway is in use, you must first obtain clearance on RT from ATC.

Instrument Checks

11. Certain instruments cannot be checked until the aircraft is moving. Ideally, once you are clear of dispersal, these instrument checks are done on the bends of the taxiway while taxying out for take-off. They are never done in the dispersal area. While turning, check that:

a. The turn needle shows the correct direction of turn and that the ball moves in the opposite direction.

b. The HSI, RMI and magnetic compass indicate the correct heading changes.

c. The artificial horizon is steady.

After each turn, when the aircraft is taxying straight, check that the needle and slip ball have returned to the central position and that the compasses show a steady heading.

Rudder Check

12. Because the rudder pedals are directly linked to the nosewheel leg, full and free movement of the rudder can be checked only when the aircraft is moving. You need a 90° turn either way to apply full rudder. So before making the check, ensure that:

a. You are well clear of obstacles.

b. You have plenty of room.

c. You are traveling at a low speed.

Changes of Surface

13. On an airfield it is often necessary to cross from one type of surface to another. There is always the possibility of meeting soft ground or a ridge unexpectedly. The change from one type of surface to another should always be done at a low speed and at an angle so that the main wheels cross the change of surface

separately; this will reduce any pitching of the aircraft. Do not brake as the aircraft passes from one surface to another because this increases the possibility of the propeller striking the ground.

AIR EXERCISE

Starting

14. Close the throttle, ensure the toe brakes are covered and put the parking brake off. Open the throttle smoothly until the aircraft moves and then reduce power to maintain the required taxying speed. The power required to taxy depends upon the wind speed and direction and the surface and gradient of the taxiway.

Stopping

15. When about to stop, make sure that the rudder bar is central so that the nosewheel is pointing straight ahead. To stop the aircraft, close the throttle and gently apply the toe brakes, evenly and smoothly, until the aircraft stops. When the aircraft is stationary, depress the toe brakes fully and put the parking brake on. Set 1200 rpm and check that the brakes are holding.

Turning

16. As noted earlier, the rudder pedals are connected to the nosewheel leg. Thus, the aircraft is turned on the ground by operating the rudder pedal; right foot forward to turn right and left foot forward to turn left (Fig 5.2). The greater the movement of the rudder pedals, the smaller is the radius of the turn. If full rudder pedal movement does not produce a tight enough turn, then brakes can be used in the direction of the turn to assist; if turning left, a touch on the left brake toe pedal will produce a tighter turn. Although the correct use of brake produces a smaller radius turn, it also causes the nosewheel to scuff and should not be used unless absolutely necessary.

17. The aircraft's tendency to weathercock will tighten up turns into wind. Turns downwind are more sluggish. By being constantly aware of the wind direction, the efforts necessary to turn into wind or downwind can be anticipated.

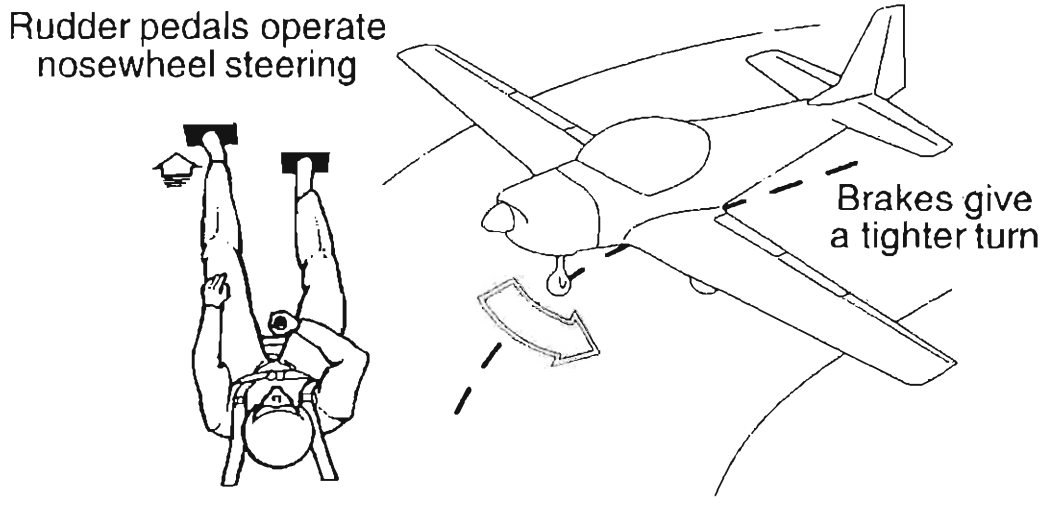

Fig 5.2 How to turn a Firefly during taxying