U.S. Department
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Administration

FAA-H-8083-3A

Airplane Flying Handbook

PREFACE

The *Airplane Flying Handbook* is designed as a technical manual to introduce basic pilot skills and knowledge that are essential for piloting airplanes. It provides information on transition to other airplanes and the operation of various airplane systems. It is developed by the Flight Standards Service, Airman Testing Standards Branch, in cooperation with various aviation educators and industry.

This handbook is developed to assist student pilots learning to fly airplanes. It is also beneficial to pilots who wish to improve their flying proficiency and aeronautical knowledge, those pilots preparing for additional certificates or ratings, and flight instructors engaged in the instruction of both student and certificated pilots. It introduces the future pilot to the realm of flight and provides information and guidance in the performance of procedures and maneuvers required for pilot certification. Topics such as navigation and communication, meteorology, use of flight information publications, regulations, and aeronautical decision making are available in other Federal Aviation Administration (FAA) publications.

This handbook conforms to pilot training and certification concepts established by the FAA. There are different ways of teaching, as well as performing flight procedures and maneuvers, and many variations in the explanations of aerodynamic theories and principles. This handbook adopts a selective method and concept of flying airplanes. The discussion and explanations reflect the most commonly used practices and principles. Occasionally the word "must" or similar language is used where the desired action is deemed critical. The use of such language is not intended to add to, interpret, or relieve a duty imposed by Title 14 of the Code of Federal Regulations (14 CFR).

It is essential for persons using this handbook to also become familiar with and apply the pertinent parts of 14 CFR and the *Aeronautical Information Manual (AIM)*. The AIM is available online at **http://www.faa.gov/atpubs**. Performance standards for demonstrating competence required for pilot certification are prescribed in the appropriate airplane practical test standard.

The current Flight Standards Service airman training and testing material and subject matter knowledge codes for all airman certificates and ratings can be obtained from the Flight Standards Service Web site at **http://av-info.faa.gov**.

The FAA greatly acknowledges the valuable assistance provided by many individuals and organizations throughout the aviation community whose expertise contributed to the preparation of this handbook.

This handbook supersedes FAA-H-8083-3, *Airplane Flying Handbook*, dated 1999. This handbook also supersedes AC 61-9B, *Pilot Transition Courses for Complex Single-Engine and Light Twin-Engine Airplanes*, dated 1974; and related portions of AC 61-10A, *Private and Commercial Pilots Refresher Courses*, dated 1972. This revision expands all technical subject areas from the previous edition, FAA-H-8083-3. It also incorporates new areas of safety concerns and technical information not previously covered. The chapters covering transition to seaplanes and skiplanes have been removed. They will be incorporated into a new handbook (under development), FAA-H-8083-23, *Seaplane, Skiplane and Float/Ski Equipped Helicopter Operations Handbook*.

This handbook is available for download from the Flight Standards Service Web site at **http://av-info.faa.gov**. This web site also provides information about availablity of printed copies.

This handbook is published by the U.S. Department of Transportation, Federal Aviation Administration, Airman Testing Standards Branch, AFS-630, P.O. Box 25082, Oklahoma City, OK 73125. Comments regarding this handbook should be sent in e-mail form to **AFS630comments@faa.gov**.

AC 00-2, Advisory Circular Checklist, transmits the current status of FAA advisory circulars and other flight information publications. This checklist is available via the Internet at **http://www.faa.gov/aba/html_policies/ac00_2.html**.

are less likely to be misunderstood than SWITCH ON and SWITCH OFF.

When removing the wheel chocks after the engine starts, it is essential that the pilot remember that the propeller is almost invisible. Incredible as it may seem, serious injuries and fatalities occur when people who have just started an engine walk or reach into the propeller arc to remove the chocks. Before the chocks are removed, the throttle should be set to idle and the chocks approached from the rear of the propeller. Never approach the chocks from the front or the side.

The procedures for hand propping should always be in accordance with the manufacturer's recommendations and checklist. Special starting procedures are used when the engine is already warm, very cold, or when flooded or vapor locked. There will also be a different starting procedure when an external power source is used.

TAXIING

The following basic taxi information is applicable to both nosewheel and tailwheel airplanes.

Taxiing is the controlled movement of the airplane under its own power while on the ground. Since an airplane is moved under its own power between the parking area and the runway, the pilot must thoroughly understand and be proficient in taxi procedures.

An awareness of other aircraft that are taking off, landing, or taxiing, and consideration for the right-of-way of others is essential to safety. When taxiing, the pilot's eyes should be looking outside the airplane, to the sides, as well as the front. The pilot must be aware of the entire area around the airplane to ensure that the airplane will clear all obstructions and other aircraft. If at any time there is doubt about the clearance from an object, the pilot should stop the airplane and have someone check the clearance. It may be necessary to have the airplane towed or physically moved by a ground crew.

It is difficult to set any rule for a single, safe taxiing speed. What is reasonable and prudent under some conditions may be imprudent or hazardous under others. The primary requirements for safe taxiing are positive control, the ability to recognize potential hazards in time to avoid them, and the ability to stop or turn where and when desired, without undue reliance on the brakes. Pilots should proceed at a cautious speed on congested or busy ramps. Normally, the speed should be at the rate where movement of the airplane is dependent on the throttle. That is, slow enough so when the throttle is closed, the airplane can be stopped promptly. When yellow taxiway centerline stripes are provided, they should be observed unless necessary to clear airplanes or obstructions.

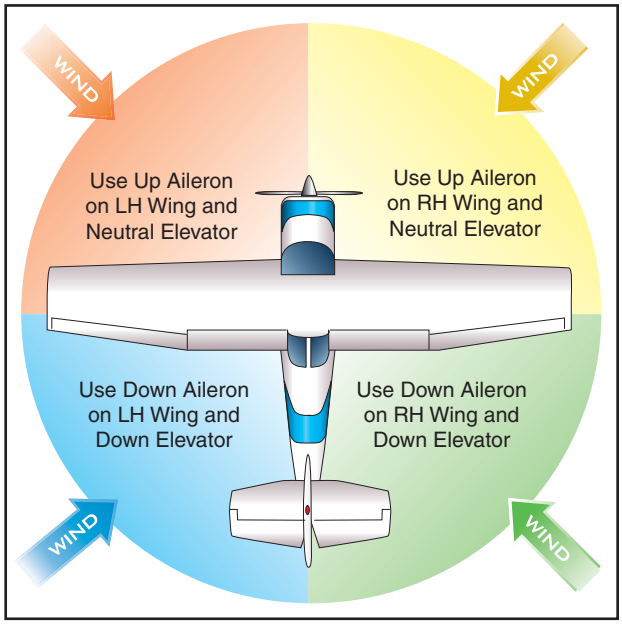

Figure 2-10. Flight control positions during taxi.

When taxiing, it is best to slow down before attempting a turn. Sharp, high-speed turns place undesirable side loads on the landing gear and may result in an uncontrollable swerve or a ground loop. This swerve is most likely to occur when turning from a downwind heading toward an upwind heading. In moderate to high-wind conditions, pilots will note the airplane's tendency to weathervane, or turn into the wind when the airplane is proceeding crosswind.

When taxiing at appropriate speeds in no-wind conditions, the aileron and elevator control surfaces have little or no effect on directional control of the airplane. The controls should not be considered steering devices and should be held in a neutral position. Their proper use while taxiing in windy conditions will be discussed later. [Figure 2-10]

Steering is accomplished with rudder pedals and brakes. To turn the airplane on the ground, the pilot should apply rudder in the desired direction of turn and use whatever power or brake that is necessary to control the taxi speed. The rudder pedal should be held in the direction of the turn until just short of the point where the turn is to be stopped. Rudder pressure is then released or opposite pressure is applied as needed.

More engine power may be required to start the airplane moving forward, or to start a turn, than is required to keep it moving in any given direction. When using additional power, the throttle should immediately be retarded once the airplane begins moving, to prevent excessive acceleration.

When first beginning to taxi, the brakes should be tested for proper operation as soon as the airplane is put in motion. Applying power to start the airplane