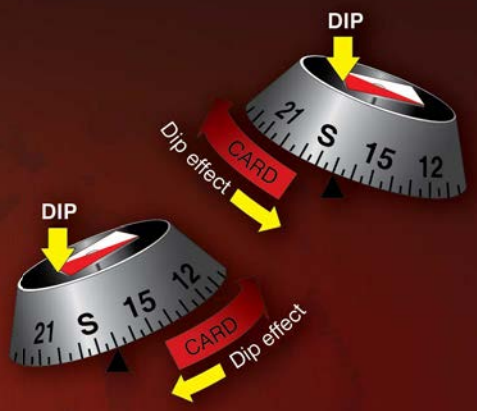
FAA-H-8083-25B

Pilot's Handbook of Aeronautical Knowledge



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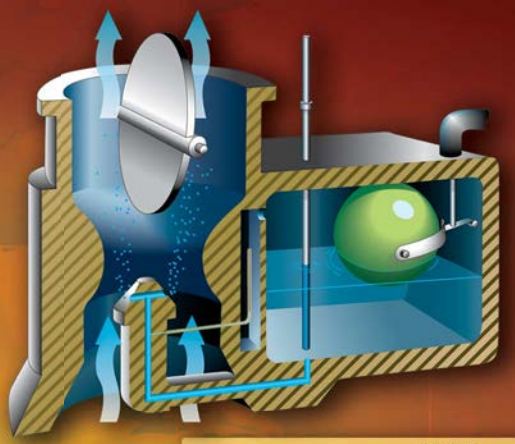

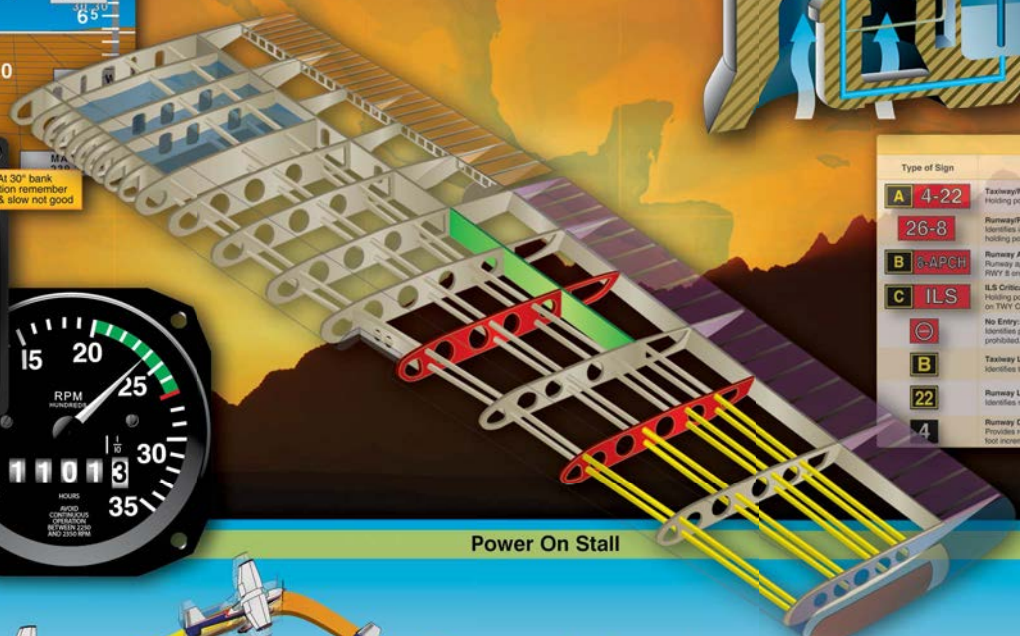

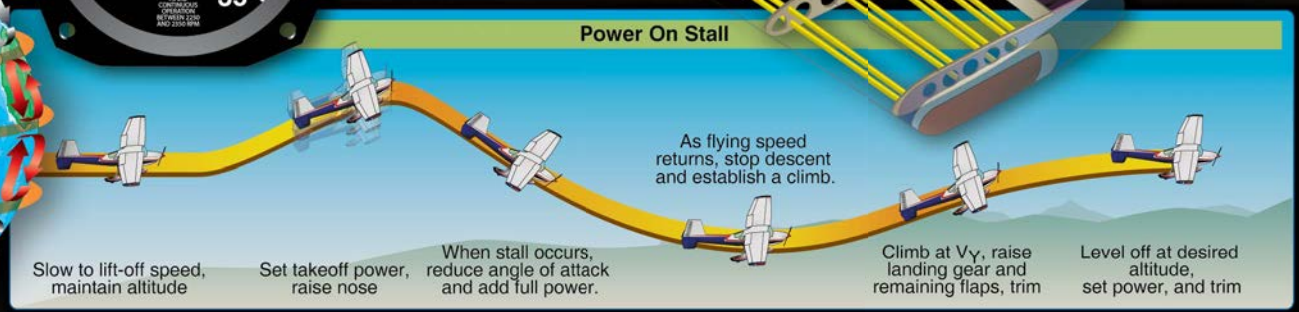

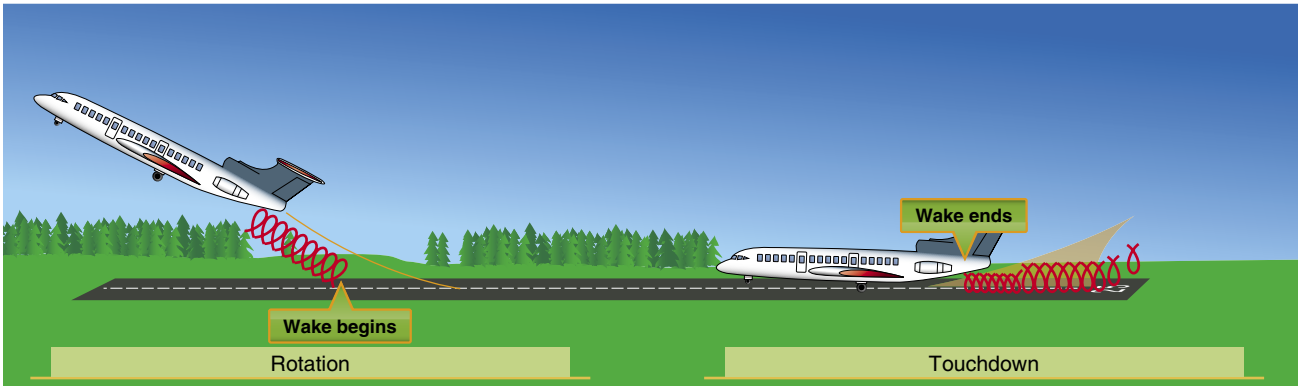

Figure 13-21. *Vortex behavior.*

When the vortices of larger aircraft sink close to the ground (within 100 to 200 feet), they tend to move laterally over the ground at a speed of 2–3 knots. A crosswind decreases the lateral movement of the upwind vortex and increases the movement of the downwind vortex. A tailwind condition can move the vortices of the preceding aircraft forward into the touchdown zone.

Vortex Avoidance Procedures

- Landing behind a larger aircraft on the same runway—stay at or above the larger aircraft's approach flightpath and land beyond its touchdown point.
- Landing behind a larger aircraft on a parallel runway closer than 2,500 feet—consider the possibility of drift and stay at or above the larger aircraft's final approach flightpath and note its touch down point.
- Landing behind a larger aircraft on crossing runway—cross above the larger aircraft's flightpath.
- Landing behind a departing aircraft on the same runway—land prior to the departing aircraft's rotating point.
- Landing behind a larger aircraft on a crossing runway—note the aircraft's rotation point and, if that point is past the intersection, continue and land prior to the intersection. If the larger aircraft rotates prior to the intersection, avoid flight below its flightpath. Abandon the approach unless a landing is ensured well before reaching the intersection.
- Departing behind a large aircraft—rotate prior to the large aircraft's rotation point and climb above its climb path until turning clear of the wake.
- For intersection takeoffs on the same runway—be alert to adjacent larger aircraft operations, particularly upwind of the runway of intended use. If an intersection takeoff clearance is received, avoid headings that cross below the larger aircraft's path.
- If departing or landing after a large aircraft executing a low approach, missed approach, or touch and go landing (since vortices settle and move laterally near the ground, the vortex hazard may exist along the runway and in the flightpath, particularly in a quartering tailwind), it is prudent to wait at least 2 minutes prior to a takeoff or landing.
- En route it is advisable to avoid a path below and behind a large aircraft, and if a large aircraft is observed above on the same track, change the aircraft position laterally and preferably upwind.

Collision Avoidance

14 CFR part 91 has established right-of-way rules, minimum safe altitudes, and VFR cruising altitudes to enhance flight safety. The pilot can contribute to collision avoidance by being alert and scanning for other aircraft. This is particularly important in the vicinity of an airport.

Effective scanning is accomplished with a series of short, regularly spaced eye movements that bring successive areas of the sky into the central visual field. Each movement should not exceed 10°, and each should be observed for at least 1 second to enable detection. Although back and forth eye movements seem preferred by most pilots, each pilot should develop a scanning pattern that is most comfortable and then adhere to it to assure optimum scanning. Even if entitled to the right-of-way, a pilot should yield if another aircraft seems too close.

Clearing Procedures

The following procedures and considerations should assist a pilot in collision avoidance under various situations.

- Before takeoff—prior to taxiing onto a runway or landing area in preparation for takeoff, pilots should scan the approach area for possible landing traffic, executing appropriate maneuvers to provide a clear view of the approach areas.
- Climbs and descents—during climbs and descents in flight conditions which permit visual detection of other traffic, pilots should execute gentle banks left and right at a frequency which permits continuous visual scanning of the airspace.
- Straight and level—during sustained periods of straight-and-level flight, a pilot should execute appropriate clearing procedures at periodic intervals.
- Traffic patterns—entries into traffic patterns while descending should be avoided.
- Traffic at VOR sites—due to converging traffic, sustained vigilance should be maintained in the vicinity of VORs and intersections.
- Training operations—vigilance should be maintained and clearing turns should be made prior to a practice maneuver. During instruction, the pilot should be asked to verbalize the clearing procedures (call out "clear left, right, above, and below").

High-wing and low-wing aircraft have their respective blind spots. The pilot of a high-wing aircraft should momentarily raise the wing in the direction of the intended turn and look for traffic prior to commencing the turn. The pilot of a low-wing aircraft should momentarily lower the wing and look for traffic prior to commencing the turn.

Runway Incursion Avoidance

A runway incursion is "any occurrence in the airport runway environment involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of required separation with an aircraft taking off, intending to take off, landing, or intending to land." It is important to give the same attention to operating on the surface as in other phases of flights. Proper planning can prevent runway incursions and the possibility of a ground collision. A pilot should be aware of the aircraft's position on the surface at all times and be aware of other aircraft and vehicle operations on the airport. At times towered airports can be busy and taxi instructions complex. In this situation it may be advisable to write down taxi instructions. The following are some practices to help prevent a runway incursion:

- Read back all runway crossing and/or hold instructions.
- Review airport layouts as part of preflight planning, before descending to land and while taxiing, as needed.
- Know airport signage.
- Review NOTAM for information on runway/taxiway closures and construction areas.
- Request progressive taxi instructions from ATC when unsure of the taxi route.
- Check for traffic before crossing any runway hold line and before entering a taxiway.
- Turn on aircraft lights and the rotating beacon or strobe lights while taxing.
- When landing, clear the active runway as soon as possible, then wait for taxi instructions before further movement.
- Study and use proper phraseology in order to understand and respond to ground control instructions.
- Write down complex taxi instructions at unfamiliar airports.

For more detailed information, contact the FAA's Office of Runway Safety and Operational Services web site at http://www.faa.gov/runwaysafety/ or visit http://www.aopa.org/asf/accident_data/incursions.html to access a learning tool developed by the FAA and the Aircraft Owners and Pilots Association (AOPA) to help pilots and maintenance technicians avoid runway incursions involving taxiing aircraft. Additional information can also be found in Advisory Circular (AC) 91-73, Part 91, Pilot and Flightcrew Procedures During Taxi Operations, and Part 135, Single-Pilot Procedures During Taxi Operations.

Chapter Summary

This chapter focused on airport operations both in the air and on the surface. For specific information about an unfamiliar airport, consult the A/FD and NOTAMS before flying. For further information regarding procedures discussed in this chapter, refer to 14 CFR part 91 and the AIM. By adhering to established procedures, both airport operations and safety are enhanced.