ATTACHMENT W

Excerpts from the American Airlines Flight Manual

Part 1

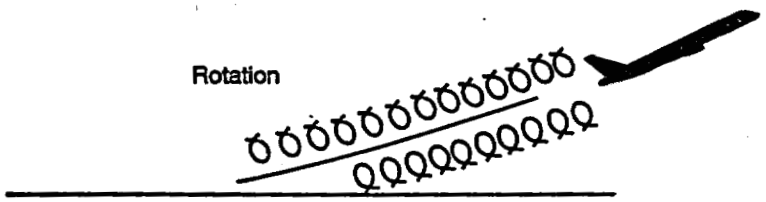
(2 pages).

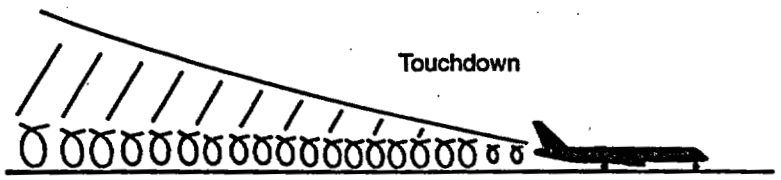
4. WAKE TURBULENCE

4.1 General

Wake Turbulence is the vortex formed at the wingtip by every aircraft in flight as a by-product of lift. Following are general characteristics of wake turbulence:

A. Wake vortices are generated from the point of aircraft rotation for takeoff to the point of touchdown.

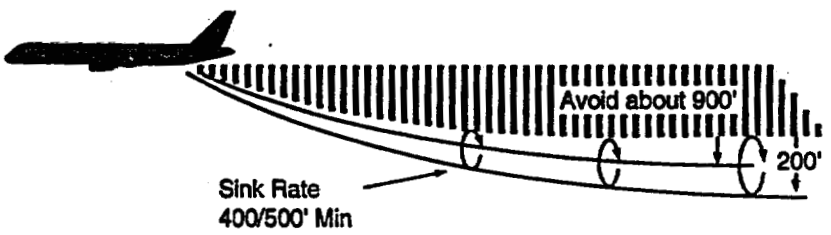




B. Intensity is greatest from a heavy aircraft flying slow in a clean configuration.

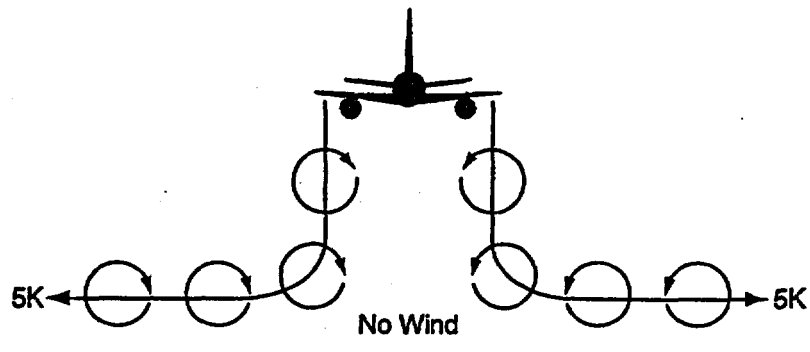
C. Intensity is greater from recently designed aircraft with higher lift wings (e.g. - 757).

D. Wake vortices formed from aircraft in flight will sink approximately 400 to 500 ft. per minute and level off approximately 900 ft. below the generating aircraft, diminishing with time and distance behind the aircraft.



E. The vortex will tend to induce a roll in the aircraft flying into another aircraft's wake.

F. A vortex generated from an aircraft near the ground will tend to move laterally over the ground at about 5 kts.



4.2 Avoidance, Separation, and Containment

A. Avoidance - use caution when operating or flying behind and just below larger aircraft, on parallel runways closer than 2500 feet for vortex drift from the adjacent runway, or approaching at or slightly above a larger aircraft you are behind.

B. Air Traffic Control Turbulence Separation Standards

1. Because of the possible effects of wake turbulence, controllers are required to apply no less than specified minimum separation for aircraft operating behind a heavy jet and 757 aircraft.
   a) Separation is applied to aircraft operating directly behind a heavy / 757 jet at the same altitude or less than 1000 ft. below:
      - Heavy jet behind heavy jet - 4 miles
      - Large / heavy behind 757 - 4 miles
      - Small behind 757 - 5 miles
      - Small / large aircraft behind heavy jet - 5 miles

   The MD-11, DC-10, A300, 767 and 777 are "Heavy" aircraft.
   The F100, DC-9, 727, 737, and 757 are "Large" aircraft.

C. Air Traffic Control Takeoff Separation Standards

1. Two minutes, or the appropriate 4 or 5 mile radar separation when takeoff behind a heavy or 757 jet will be:
   a) from the same threshold
   b) on a crossing runway and projected flight paths will cross
   c) from the threshold of a parallel runway when staggered ahead of that of the adjacent runway by less than 500 feet and when the runways are separated by less than 2500 feet.

NOTE: Controllers may not reduce or waive these intervals.