

1. What is ground effect?

A- The result of the interference of the surface of the Earth with the airflow patterns about an airplane.

B- The result of an alteration in airflow patterns increasing induced drag about the wings of an airplane.

C- The result of the disruption of the airflow patterns about the wings of an airplane to the point where the wings will no longer support the airplane in flight.

Ground effect is the result of the interference of the surface of the Earth with the airflow patterns about an airplane.

Answer (B) is incorrect because induced drag is decreased. Answer (C) is incorrect because the disruption of wing-tip vortices increases lift.

2. Floating caused by the phenomenon of ground effect will be most realized during an approach to land when at

A- less than the length of the wingspan above the surface.

B- twice the length of the wingspan above the surface.

C- a higher-than-normal angle of attack.

When the wing is at a height equal to its span, the reduction in induced drag is only 1.4%. However, when the wing is at a height equal to one-fourth its span, the reduction in induced drag is 23.5% and when the wing is at a height equal to one-tenth its span, the reduction in induced drag is 47.6%.

Answer (B) is incorrect because ground effect extends up to one wingspan length. Answer (C) is incorrect because floating will result from higher-than-normal angle of attack.

3. What must a pilot be aware of as a result of ground effect?

A- Wingtip vortices increase creating wake turbulence problems for arriving and departing aircraft.

B- Induced drag decreases; therefore, any excess speed at the point of flare may cause considerable floating.

C- A full stall landing will require less up elevator deflection than would a full stall when done free of ground effect.

The reduction of the wing-tip vortices, due to ground effect, alters the spanwise lift distribution and reduces the induced angle of attack, and induced drag causing floating.

Answer (A) is incorrect because wing-tip vortices are decreased. Answer (C) is incorrect because a full stall landing will require more up-elevator deflection, due to the increased lift in ground effect.

4. Ground effect is most likely to result in which problem?

A- Settling to the surface abruptly during landing.

B- Becoming airborne before reaching recommended takeoff speed.

C- Inability to get airborne even though airspeed is sufficient for normal takeoff needs.

Due to the reduced drag in ground effect, the airplane may seem capable of takeoff well below the recommended speed. It is important that no attempt be made to force the airplane to become airborne with a deficiency of speed. The recommended takeoff speed is necessary to provide adequate initial climb performance.

Answer (A) is incorrect because the airplane gains lift from a reduction in induced drag while entering ground effect; therefore, it does not cause the airplane to settle abruptly. Answer (C) is incorrect because ground effect helps the airplane become airborne before the airspeed is sufficient for a normal takeoff.

5. Which is a result of the phenomenon of ground effect?

A- The induced angle of attack of each rotor blade is increased.

B- The lift vector becomes more horizontal.

C- The angle of attack generating lift is increased.

In ground effect, as downwash velocity is reduced, the induced angle of attack is reduced and the lift vector becomes more vertical. Simultaneously, a reduction in induced drag occurs. In addition, as the induced angle of attack is reduced, the angle of attack generating lift is increased. The net result of these actions is a beneficial increase in lift and a lower power requirement to support a given weight.

Answer (A) is incorrect because the induced angle of attack isn't described in the first place so we can't assume a change. Answer (B) is incorrect because if lift vector became more horizontal, lift would decrease but thrust would increase in the lateral direction.