

Avoiding Helicopter Wake Turbulence



You may have heard the phrase, “there are no new ways to crash a helicopter”. Well, that may be true, however we did find a new way for a helicopter to crash an airplane! In this article we will explore the dangers of helicopter wake turbulence and how you as a pilot can protect others from this phenomenon and how we recommend others avoid you!

What is it?

Unfortunately, a few recent accidents and near misses have brought to light the hazards of helicopter wake turbulence, a term that encompasses both the downwash that is cast in all directions by a helicopter in a hover or a hover taxi, and the trailing vortices that follow a helicopter in forward flight. The term capitalizes on the familiarity pilots have with jet wake turbulence and reduces confusion around the helicopter’s phase of flight.

Give me the details!

The amount of wake turbulence that a helicopter produces is dependent on its size and weight. Larger, heavier helicopters produce more wake turbulence that can affect a broader area when compared to smaller helicopters. As an example, a larger helicopter like a Blackhawk weighs 22,000 lbs and has a rotor diameter of 53 feet. Studies have shown

that helicopters in that size and weight class can generate winds up to 30 knots even at 150 feet away! Think of a helicopter in a hover as a moving man-made microburst. As a general rule, hovering at least three rotor disk diameters away from other aircraft, vehicles, and people will help keep persons and property in the area clear. Also be mindful of hovering near areas that contain debris, or items that could become airborne such as step ladder or trash can lid.

While there has been some research conducted on helicopter downwash in a hover, there is very little information available on helicopter wake turbulence in forward flight. One investigation completed by the FAA in 1996 put aerobatic airplanes in close proximity to trailing vortices of larger helicopters. The planes practiced both following the helicopter directly and crossing behind its flight path. In all cases, within ½ mile of the helicopter, the airplanes experienced loss of control that was unrecoverable without extreme aerobatic maneuvers. It was also determined that vortex separation- the horizontal distance between the vortices- increases in descending flight and decreases in climbing flight. In other words, an aircraft following a helicopter that is descending has increased exposure to the vortices because the affected area is much broader. Conversely, a helicopter on takeoff has very powerful vortices due to the additional lift being produced at slow speed, but they are located in closer proximity to one another.

What can we do?

As a result of these findings and the studies conducted regarding helicopter downwash in a hover, a few guidelines have been developed to increase awareness around helicopter wake turbulence:

- For hovering flight or a hover taxi, stay three rotor diameters away.
- For forward flight, a minimum of 3 nm separation is recommended, especially from larger helicopters. The investigation we discussed previously discovered that even at 3nm, the planes encountered uncommanded pitch and roll oscillations.
- Leave 2 minutes for the rotor vortices to dissipate behind a helicopter in forward flight.

In addition, influencing the material that the FAA has available about helicopter wake turbulence will positively impact the intended scope. Right now, there is very limited information in the FAR/AIM and Advisory Circulars, and we can work to change that. The current guidance for air traffic controllers to warn about wake turbulence is 41,000 lbs and is targeted toward fixed wing. There are only three helicopters domestically that meet that requirement, and so many more that are lighter- we'd like to see that number come down. Lastly, if you are a CFI or DPE, please incorporate this information into your curriculum!

Given that this is relatively new information, many people including fixed wing pilots, ATC personnel, FBO or airport employees and bystanders are unaware of the insidious danger of helicopter wake turbulence. It is our responsibility as pilots and crew to take charge when it comes to maintaining separation from the helicopter we're commanding and do our best to share this information with other members of the aviation community.

Don't get caught in the wake! Follow the 3-2-2 rule:
3 rotor diameters away, 2 nm of separation, 2 minutes to dissipate.

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