

Wake Up to Helicopter Wake



Stay alert to avoid a wake turbulence encounter, or you may have an upsetting experience.

With a stiff headwind you are on approach to land in your light aircraft, number one behind an RNZAF helicopter, the new NH90. Suddenly, and without warning, pondering the reasons why helicopters fly so gracefully, your left wing drops violently and your nose pitches just as violently. You are on the cusp of losing control when miraculously you recover and land heavily, but safely. You are shaken.

What just happened? Well, you had an encounter with helicopter wake turbulence.

Helicopter Wake

Helicopters generate tip vortices and wake turbulence of a size and intensity significantly greater than those of similar weight fixed-wing aircraft. Despite this, helicopter wake turbulence is arguably not well known or understood by pilots.

The NH90

Concerns over the wake turbulence generated by the NH90 helicopter prompted a study by the Defence Technology Agency (DTA) to analyse the downwash it generates, and its effects.

Be Aware

The DTA advises that the vortex generated by helicopters is less predictable than that of fixed-wing aircraft, with the potential to rise above the helicopter. The comparatively steep approach paths of helicopters may aggravate this situation such that the trailing wake may be some distance above the helicopter.

“The conventional practice of flying a high approach to stay above the wake of a preceding aircraft may therefore not be adequate to ensure flight safety when following a helicopter”, the DTA cautions.

To Avoid a Wake Up

The DTA recommends the following for aircraft to avoid wake upsets.

- » When following the NH90, or similar helicopter, in flight or during approach to land, a three minute separation is recommended.
- » Stay well clear of hovering helicopters. At 65 metres from the NH90 you could encounter wind gusts as high as 22 knots.
- » Ideally, the NH90 should be manoeuvred downwind of the active runways and approach paths. Otherwise a three-minute separation is recommended before using a runway situated downwind of the manoeuvring helicopter.

Read More

Wake Turbulence GAP booklet, email info@caa.govt.nz for a free copy. ■

Wake turbulence is generated by the pressure differential between the lower and upper surfaces of an aerofoil producing lift, where wing tip vortices impart a rotational motion to the air. The turbulent wake can disturb following aircraft with asymmetric aerodynamic loads of such severity that control authority can be overcome and control lost.

During hover taxiing the vortex can be up to six times the combined blade tip vortices, rise up to 80 feet above the ground and be a significant hazard to aircraft hundreds of metres downwind.

There is thus a severe risk created for aircraft operating parallel but downwind from the helicopter, such as late on final approach to an adjacent runway.

In forward flight, the rotor wake is blown back and clear of the helicopter with very high vorticity to create a disk-edge vortex which resembles that of a fixed-wing aircraft but of much greater strength.

The disk-edge vortex will be up to 17 times stronger than the combined blade tip vortices. Ground effect has no effect in reducing this vorticity and so a significant risk is created at great distances behind the helicopter both in and out of ground effect. The disk-edge vortex is most severe during the transition from forward flight to the hover, as occurs when approaching to land. The vortices will expand and drift with the wind such that operations on parallel runways downwind may be affected by severe disturbances.

Excerpts from the DTA study