

## Wake turbulence

According meteorologists tornadoes rarely merge and when they do, the strongest tornado seems to absorb the smaller one without gaining much strength if any.

Small vortices generated at the trailing edge of one wing is rotating in the same direction and assuming the tornado behavior the strongest of them will slowly weaken the other without gaining any significant strength.

The wing trailing edge is sharp and the strength of each single vortex generated there will probably not be significant.

Thus, despite a vortex sheet may be rolling up behind the aircraft the trailing edge vortices if any cannot contribute much to the energy hold by the wake turbulence aircraft are leaving behind.

Please, anyone show me pictures from wind tunnel tests or real life pictures where wing trailing edge vortices are visible?

Pictures showing vortices trailing wing tips and edges of extended flap sections don't seem to indicate any joining up in a vortex sheet.



So where does the wake turbulence come from?

Though wing tip vortices will be present throughout the flight regime and can have significant strength, I believe the major source in generating wake turbulence during take-off and landing is the collapse of air behind the aircraft fuselage and wings .

When you plow a fat wide-body aircraft through the air, the air behind that fat fuselage and wings must collapse inward from all sides. At high angle of attack (Fig. 1) where the frontal area relative to the flight path has increased dramatically the collapse of air is not as much behind the airplane as above the aft part of the fuselage, and in this case the air from below is blocked and pushed down by the wings and fuselage thus air is mainly streaming in from above as low pressures also exist out to the sides. At the same time high pressure from below the wing is seeking upward at the wing tips and outer edge of flap sections. Air coming down at the center and air going up out to the sides create the two vortices that constitute the potential dangerous wake of turbulent air. The bottleneck created between the two vortices is the reason for the vortices taking a path down and outward.

Fig. 1



End