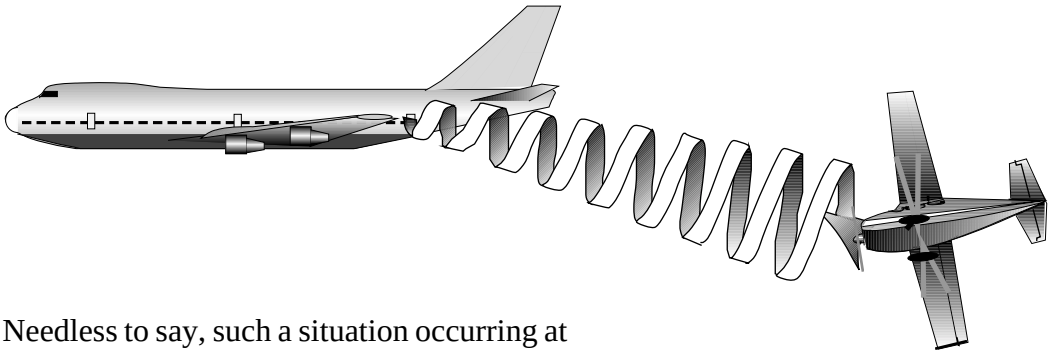
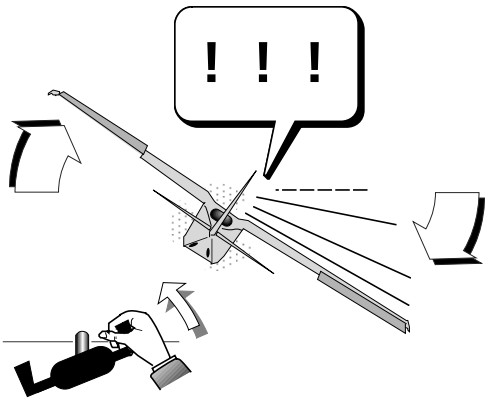
The problem of wake turbulence.

The vortices which trail behind a large aircraft tend to persist as two rapidly rotating 'horizontal whirlpools' which are shed from each wingtip. A following aircraft which encounters these vortices is likely to experience a strong tendency to roll or yaw [or both] as it attempts to rotate with the circulating vortex. The rotation will be clockwise in the vortex from the left wing and anticlockwise in the vortex from the right wing. In some cases the rate of roll induced can be greater than the correcting roll rate available from aileron deflection. In this case the aircraft would continue to roll in the direction of the vortex even though full opposite aileron was applied!



Needless to say, such a situation occurring at low level would lead to a disastrous loss of control with fatal consequences.



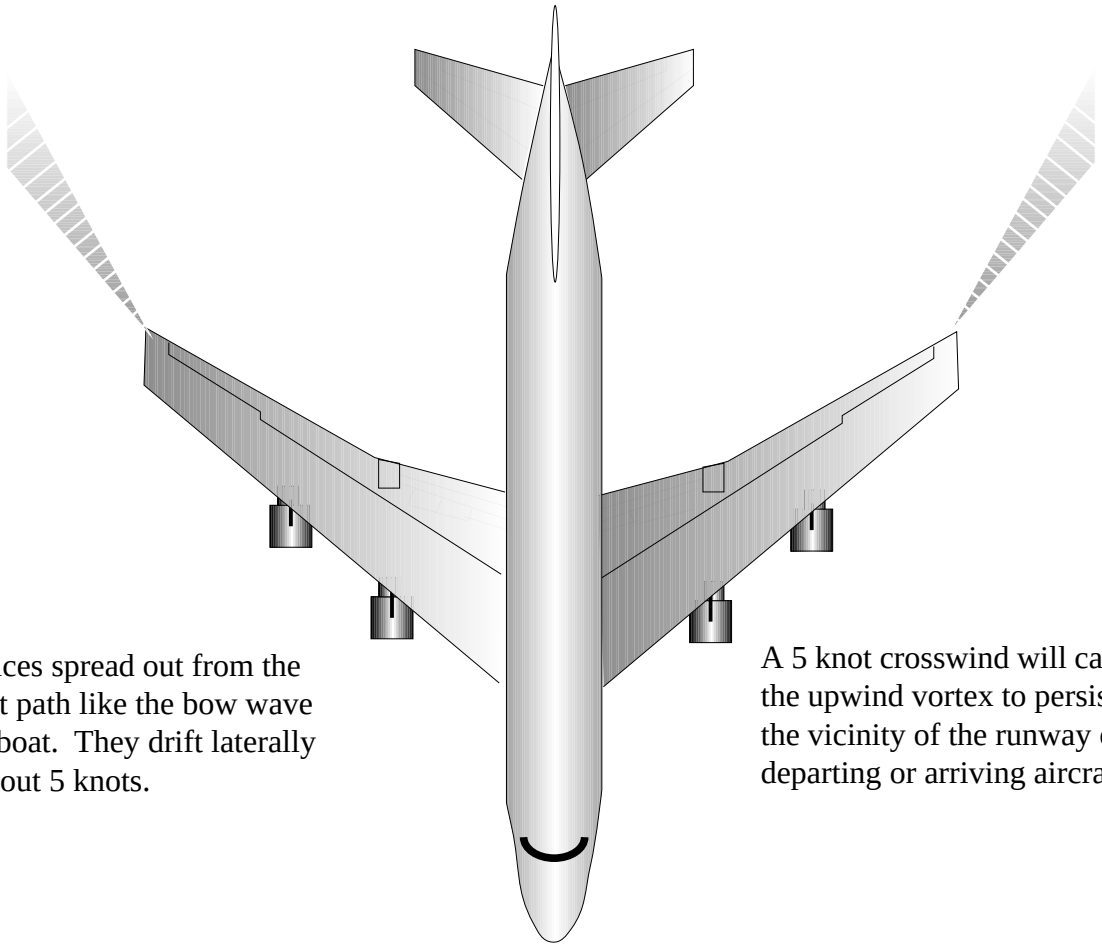
Much research has been done on the behaviour of vortices after they have been shed from the wing and, armed with this understanding, there are some simple precautions the following pilot can take to reduce the chances of such an encounter.

Once they have formed, vortices become part and parcel of the air and it can be useful to imagine that they behave like smoke. They drift with the wind.

Studies have shown that each vortex moves out from the generating aircraft's flight path just as the bow wave of a boat moves out in a 'V' shape from the direction of travel. Also as the vortices spread out in this manner, they sink at about 500 feet per minute behind the flight path. At 700 to 1000 feet below the flight path the vortices tend to stabilize. Close to the ground the vortices persist for between one and two minutes, while at height they may persist for up to five minutes in calm conditions. Depending on the generating aircraft's speed, the vortex trails may extend for two to five miles.

It follows that if the following aircraft remains above the generating aircraft, or more than 1000 feet below it, the chances of an encounter with vortices is greatly reduced. If this vertical separation is not possible, the following aircraft should remain upwind of the generating aircraft. Planning to land beyond the touchdown point of the heavier aircraft and planning to become airborne before its lift-off point on take-off will also reduce the chance of an encounter.

Vortices sink down at a rate of about 500 feet per minuite until they reach a level about 700 to 1000 feet below the flight path



Vortices spread out from the flight path like the bow wave of a boat. They drift laterally at about 5 knots.

A 5 knot crosswind will cause the upwind vortex to persist in the vicinity of the runway of a departing or arriving aircraft.