NEWS AND VIEWS

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Coming Events

1. Next COPA 26 Meeting is Tuesday September 12, 2023. Details to follow. Have a Great summer!
2. The next Pilot Decision Making (PDM) Zoom Workshop is Oct 4, 2023. To join, send an email to cykf.pilotworkshop@gmail.com.
3. Gary Grass will speak at the Sept 12, 2023 meeting. Gary was a pilot and maintenance engineer on the Martin Mars water bomber and will share his stories and photos of firefighting with this iconic water bomber!

In this Issue!

Welcome!

Wake Turbulence!

By Warren Cresswell

Source: Wikipedia

Coming Events!

- September 9 - Parry Sound Fly-In at CNK4
- Sept 8-10 - London International Airshow
- Sept 16-17 - Tiger Boys Open House at Guelph Airpark CNC4
- Oct 7 - Pigs and Pies Fall Fly-In - Westport CRL2 (camping too)

In 2009 a Piper PA-31-350 Chieftan, operating on a VFR flight plan from Victoria to Vancouver and executing a visual approach at YVR, was following an Airbus A321 and crashed 3nm short of Runway 26R. A post impact explosion and fire resulted. Both crew members operating the Chieftan cargo flight were killed.

In June 2006, while on visual approach at Kansas City International, the pilot of a Piper Saratoga crossed 600 feet below and about two minutes behind the flightpath of a Boeing 737 that was landing ahead on a separate, parallel runway. Flight control of the Piper was lost when the right-side stabilator and right wing departed the aircraft which then spiralled to the ground destroying the plane and killing the pilot and passenger.

In another event, a Falcon 2000 private jet was following in trail behind a B777 on a Standard Terminal Arrival Route into Washington D.C. and was a full 16 miles back from the preceding Triple 7 when the Falcon was rocked by turbulence and was suddenly rolled 60 degrees to the right. In this case, the pilot flying was able to disconnect the autopilot and re-stabilize the aircraft.

In 2006 at KSEA Seattle-Tacoma Int'l, a Cessna 172 was executing a straight-in approach to the left parallel runway. Approaching from behind and above the Cessna, on approach for the right-side parallel runway, was a Boeing 747. At KSEA the parallel runways are situated closely together – less than 2500 feet apart. A good crosswind was blowing across both runways, coming from the side where the Boeing was landing. On its approach, the B747 overtook the Cessna. When it reached a point about one-quarter mile ahead and below the Cessna, the C-172 was rocked by turbulence and departed controlled flight, only to re-establish it just 150 feet above terrain and save the day.

On November 12, 2001, American Airlines # 587, an Airbus A300-605R, departed Rwy 31 in VMC conditions at J.F. Kennedy Airport in NYC following a Japan Airlines B-747-400. In less than two minutes AA#587 hit wake turbulence from the Japan Airlines Boeing 747 which caused AA #587's vertical stabilizer to fail. The aircraft entered a flat spin, shed its two engines and crashed into a residential area killing all 260 aboard plus five on the ground, making this the 2nd deadliest aviation accident in U.S. history (NTSB: AAR-04-04 (1) Accident DCA 02MA001 (1).

In each case, the lighter aircraft had been following, or was in close vicinity to, a preceding heavier aircraft and fell victim to the wake turbulence caused by wing-tip vortices coming off the aircraft ahead.

This article will explore just what wake turbulence is, what the risks are, how potentially dangerous wake turbulence circumstances can be recognized and anticipated, and what tactical actions pilots can take to mitigate the risk of a wake turbulence encounter.

This should be of interest to CYKF flyers because the rapid increase in overall traffic, which made CYKF the 6th busiest airport in Canada in 2021, consists of an apparently ever-increasing mix of light and heavier aircraft.

In CYKF and surrounding airspace more heavier aircraft, including not just the B737s of WestJet, Flair and Sunwing, but also a whole myriad of non-scheduled turbojets, turboprops and heavy piston aircraft, are sharing the airspace with smaller GA aircraft. These larger and faster aircraft are operating at relatively low levels in the immediate airport environment as they arrive to or depart from CYKF. For example, jet traffic flying inbound to CYKF from the West for the RNAV (RNP) Rwy 26 approach can be as low as 4,000 feet when 5-6nm abeam the airport, then descending on a curved RNP approach path to an altitude of only 2200 feet MSL prior to intercepting the final approach course.

Additionally, these heavier aircraft can be flying low and at higher speeds in the vicinity of CYKF airspace when on Standard Terminal Arrival Procedures ("STARs") into nearby Hamilton, not to mention Toronto Pearson. Good wake turbulence awareness and procedures are necessary to ensure safe flying not just around home base but wherever we fly.

What are wing tip vortices and wake turbulence and what dangers do they present for lighter GA aircraft?

Wake turbulence is caused by wing-tip vortices, which are the product of lift. Every aircraft in flight generates wake vortices. These vortices begin when the nose wheel lifts off during takeoff rotation and ends when the nosewheel touches back down on landing. Higher air pressure under the wings tries to move to the lower air pressure on top of the wings and flows outward toward the wingtips. The pressure differential triggers the rollup of the airflow aft of the wing as the aircraft advances. This results in a twisting rotary motion that is very pronounced at the wing tips and continues to spill over the top in a downward spiral or vortex which then sinks away behind the aircraft. Seen from the rear of the flightpath, are two, counter-rotating, cylindrical vortices one near each wingtip; the left vortex rotating clockwise, and the right-side spinning counter-clockwise.

The strength of the vortex is governed by the weight, speed, wing shape and span and configuration of the generating aircraft. Vortex strength increases proportionately with an increase in aircraft operating weight and/or a decrease in aircraft speed. Testing shows that vortex speeds up to almost **300 feet per second** may occur. **Putting this in a context that pilots are more familiar with, vortex rotation speed is equivalent to 18,000 feet per minute!** Testing also indicates that the vortex consists of a centre core that can vary from several inches in diameter to several feet and is surrounded by an outer region that can be as large as 100 feet in diameter. Rotational speeds are highest in the core area and begin to dissipate in the surrounding outer region the further out from the centre of the core.

All types of aircraft can be affected by wing-tip vortices, but pilots of short-span aircraft, even of the high-performance type, must be especially alert to vortex encounters.

The greatest vortex strength **occurs when the generating aircraft is heavy, slow and clean.** **In some cases, the violence of wake turbulence can simply be too much to deal with** as the Piper Saratoga accident cited above demonstrated.

ICAO aircraft weight classes, based on the Maximum Takeoff Weight ("MTOW"), can help pilots understand how heavy the aircraft they are following are, and guide risk assessment for wake turbulence.

LIGHT:	7000 kg/15,500 lbs or less
MEDIUM:	Greater than 7,000 kg but less than 136,000 kg/300,000 lbs
HEAVY:	Greater than 136,000 kg but less than 560,000 kg/1,234,589 lbs
SUPER HEAVY:	560,000 kg/1,234,589 lbs or more.

Even larger aircraft that are following aircraft that are even heavier can encounter dangerous wake turbulence as evidenced by the American Airlines 587 accident cited above. In this instance the Airbus which had a MTOW of about 288,000 lbs – just below HEAVY class - came to grief behind a much heavier B-747-400 with an all-up weight of about 875,000 lbs.

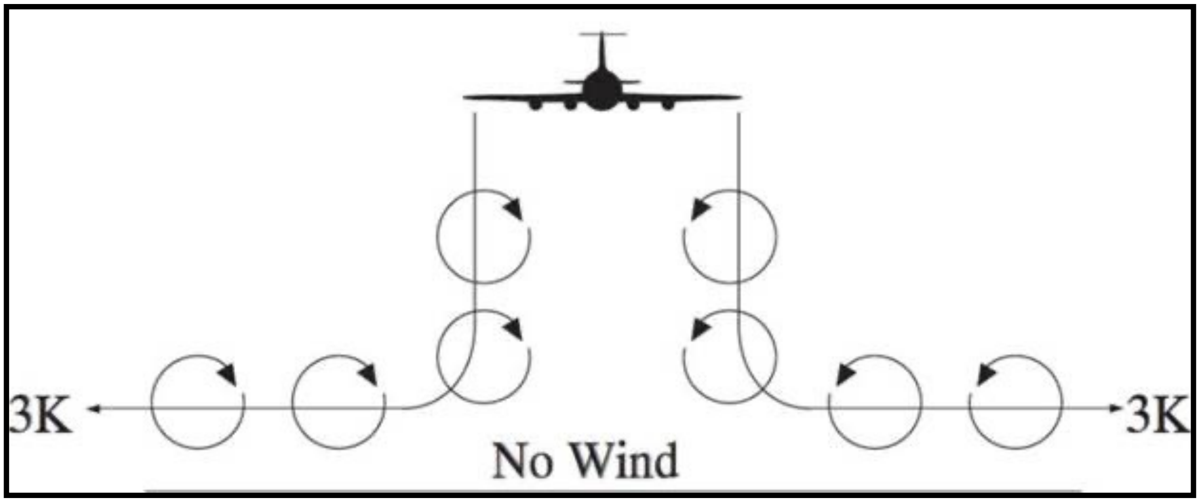
More common however are accidents involving small/light aircraft trailing larger, heavier aircraft. In a Flight Safety Foundation 2002 study examining 355 US based wake turbulence events between 1983 and 2000, two-thirds of the events involved small/light aircraft trailing larger aircraft.

But don't be fooled into thinking that the risk of a wake turbulence encounter in your light GA aircraft is restricted only to encounters with MEDIUM, HEAVY OR SUPER HEAVY aircraft, as defined by the ICAO weight categories above. It doesn't have to just be a heavyweight jet aircraft ahead, that can cause wake turbulence havoc.

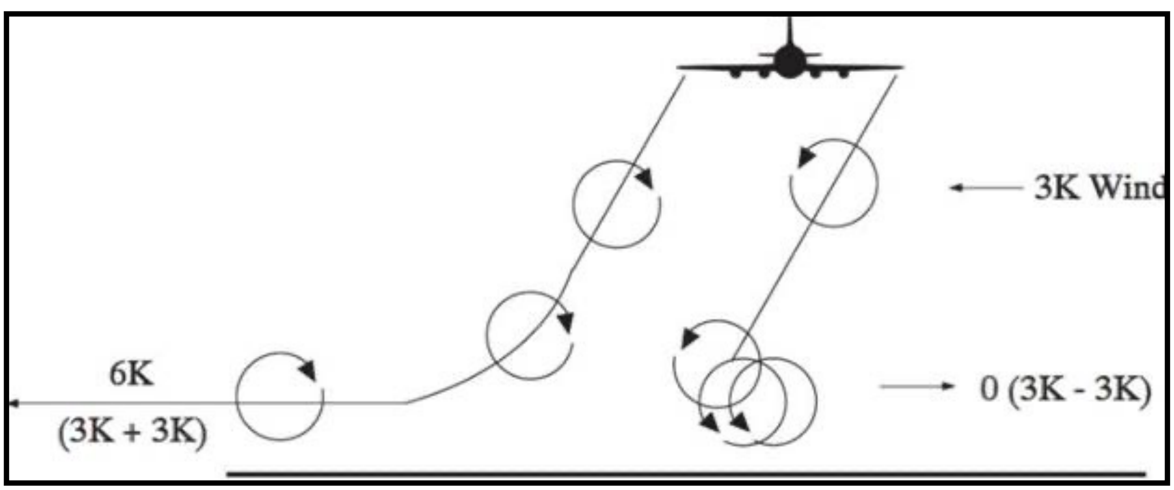
A Bonanza recently found this out at Oshkosh in 2019. Following a Ford Trimotor which was short final, then landed 30 seconds beforehand, the Bonanza hit the Trimotor's wake turbulence at very low altitude causing a 30-degree bank and rapid loss of remaining altitude. The Bonanza pilot applied rapid, corrective action but could not avoid a very hard landing which damaged the landing gear. (Watch Youtube video "Bonanza Incident Oshkosh 2019"). In this case, the Trimotor was both slow and clean (Trimotor's have no flaps). Its MTOW was only about 4,600 kg more than that of the Bonanza. The point is that **pilots of light GA aircraft should really be conscious of the risk of wake turbulence when operating behind and/or below ANY larger aircraft.**

Wing-tip vortices come off the trailing edge of the wing and begin to drift downwards. Typical sink rate is about 300'-500' per minute. In calm air, stabilization occurs about 500'-900' below the generating aircraft altitude. The lifespan of an airborne vortex, as it continues to descend, can be affected by environmental factors such as winds, turbulence etc. Calm winds and minimal turbulence in the airmass result in longer lifespans and can extend as far as 10nm or more in trail, as shown by the example of the Falcon jet at Washington.

Upon sinking close to the ground (within100-200 feet), the vortices move outward at about 2-3 knots (when no wind) at an altitude of slightly less than one-half-wingspan. The lifespan for a vortex that has reached the ground and begins to rollout to each side is approximately 30 seconds with a wind speed between 5 and 10 knots; up to 85 seconds when the wind speed is less than 5 knots and even higher in completely still air conditions.



Source: Pilot Institute



Wingtip Vortices with Crosswind - (Source -Pilot Institute)

Since vortices roll outward once they have entered ground effect or prior to touchdown, some care needs to be taken at airports with parallel, active runways, **particularly those that are closely spaced less than 2,500 feet apart** as was the case for the C-172 at Seattle. At these closely spaced parallel runways the possibility exists, under certain wind conditions, for vortices to drift from the approach path of one of the parallel runways to the other.

Repeating the main caution: Many wake turbulence accidents/incidents affect the (usually) lighter, trailing aircraft when it is flying below and behind a heavier aircraft, and especially when the preceding, heavier aircraft is flying slow and in a clean configuration. Most of these wake turbulence events occur at low altitude and during approach, landing or take-off.

What can happen when the aircraft encounters wake turbulence?

The first indication, often without warning, is a loud thump followed immediately by a sudden, induced, rolling moment that can exceed the roll capability of the encountering aircraft. Associated with this may be loss of altitude. In extreme cases, the rolling force and resultant counter control introduced by the pilot or autopilot, can result in forces that exceed the design parameters of aircraft controls and damage them. As we saw in the case of the Piper Saratoga at Kansas City, this can lead to breakup of the aircraft while airborne. In lesser occurrences there may still be some damage to the aircraft or injuries to crew or passengers.

In order to correct for an unexpected wake turbulence encounter, the indicated pilot actions are usually:

- Use counter aileron in the opposite direction of the induced roll (*)
- Apply opposite rudder (*)
- Altitude permitting, reduce power, perhaps all the way to idle – reducing airspeed to maneuvering speed (Va) if able.
- Apply elevator correction, as necessary, to first level the aircraft then pitch back up to recover any lost altitude or, perhaps, re-establish on the glideslope/glidepath.

(**Note** *) Some airlines and the FAA caution, as available altitude permits, against overuse of counter-controls with aileron and rudder which can exacerbate the unusual attitude caused by the wake turbulence and, in some cases, lead to structural failure of aircraft components. (Refer to FAA Advisory Circular No. 90-23G Aircraft Wake Turbulence 2014). In the AA #587 accident cited earlier, the NTSB found that the probable cause leading to the vertical stabilizer failure and subsequent loss of the aircraft was overly aggressive countermeasures, especially excessive use of rudder, by the pilot flying.

It is helpful for the pilot to be cognizant of the conditions and situations that pose the greatest danger from wake turbulence so that these might be anticipated, and mitigation tactics employed. Here are some of the highest risk scenarios:

- Closely following behind and below a larger aircraft ahead on approach for landing, to the same runway, an intersecting runway or a closely spaced, parallel runway with a crosswind. The heavier aircraft ahead is slow and in a clean configuration.

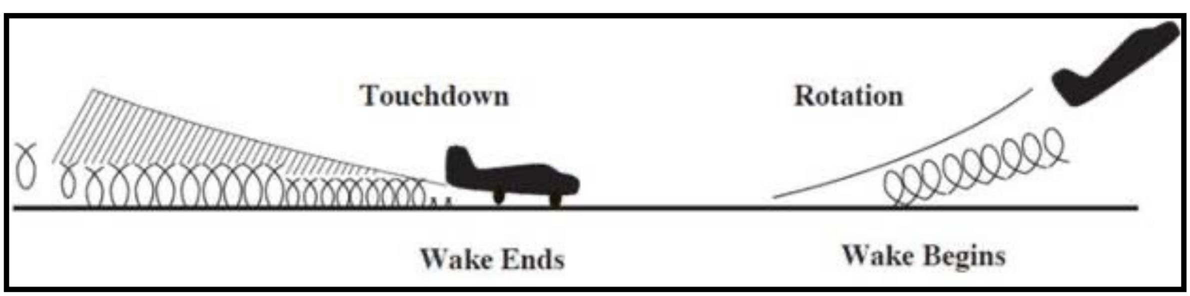
- Landing or taking off behind a preceding heavier aircraft that has just landed, taken off or conducted a low/missed approach or Touch & Go, whether on the same or an intersecting or closely spaced parallel runway.

- Taking off behind a heavier aircraft that has (a) just landed or taken off from the runway ahead from an intersecting runway, or a nearby parallel runway when crosswinds exist (b) just executed a low/missed approach or Touch and Go to the runway ahead or an intersecting runway. Particularly when the preceding heavier aircraft has a climb capability much greater than that of your aircraft.

- Enroute VFR aircraft, following hemispheric direction of flight rules, finding themselves only 500 feet below a heavier aircraft operating on an IFR flight plan.

- Taxiing across a live runway where a heavy aircraft has just landed, departed or conducted a low or missed approach or Touch and Go.

- Operating in close proximity to helicopters - which develop strong rotor-blade vortices in flight not unlike those generated by heavier fixed-wing aircraft.



Wake Vortice Generation (Source - Pilot Institute)

Of course, the BEST PLAN is to take advantage of all available resources to AVOID WAKE TURBULENCE IN THE FIRST PLACE. Here are some ideas to help accomplish that:

Air Traffic Control can assist. Centre, Terminal and Tower controllers will properly space all **IFR traffic** using separation minima for wake turbulence avoidance. For such aircraft operating (a) directly behind and at the same altitude, or less than 1000' below the preceding aircraft AND
(b) for aircraft that will cross behind a climbing or descending preceding heavier aircraft and the following aircraft is at the same altitude or less than 1000' below the altitude being vacated by the preceding aircraft at the crossing point, the enroute separation minima are:

Light behind a Super:	**8miles**	Medium behind a Heavy	5 miles
Medium behind a Super:	7 miles	Super behind a Super	4 miles
Light behind a Heavy:	**6 miles**	Heavy behind a Heavy	4 miles
Heavy behind a Super:	5 miles	**Light behind a Medium**	**4 miles**

On approach, aircraft shall be separated using one of the following minima:

A) 2.5 miles between aircraft established on the same final approach course within 10 miles of the landing runway provided that: (i) the leading aircraft is not a HEAVY and (ii) The following aircraft's weight category is the same or heavier than that of the leading aircraft and the runway is bare and dry.

B) Otherwise, the 4/5/6/7/8-mile separation minima noted above apply.

An exception to these distance-based separation methodologies is now in effect at Toronto Pearson (CYYZ) for aircraft on final approach. Since May 2022, NAV CANADA Terminal and Tower controllers are successfully using an innovative, new system called Time-Based Separation ("TBS").

Successfully pioneered at London's Heathrow Airport, this new separation technology is especially valuable during times of strong headwinds for approach and landing, improving system capacity by up to 60% when these conditions prevail. The reason is that wake turbulence vortices dissipate faster during times of strong headwinds, allowing aircraft to fly closer together than would normally be the case using distance-based separation.

The tool calculates optimal time intervals between arrivals factoring in elements such as winds, type and performance specifications of aircraft and the specific runway configuration of the airport itself. The arrival data then appear on controller's radar screens. NAV CANADA is presently only the 2nd in the world to adopt TBS and it currently is in use only at CYYZ. If successful however, one can imagine that in the future every large, busy airport may adopt TBS as well.

Depending on altitude (eg. when below class B airspace in Canada), aircraft operating under VFR rules may not have the provision of ATC separation available but can still attempt to emulate the IFR guidelines, giving large aircraft a wide berth. Monitoring Enroute ATC frequencies and taking advantage of En route Radar Surveillance (aka "Flight Following") are good ideas for the VFR pilots to enhance positional awareness relative to heavier aircraft operating nearby.

At towered airports, ATC will apply a 2-minute separation to any aircraft that takes off into the wake of a known HEAVY aircraft if the lighter aircraft following commences the takeoff from the threshold of the same runway.

ATC will apply a 3-minute separation interval for any aircraft that takes off into the wake of a known HEAVY if the following aircraft starts its takeoff roll from an intersection or from a point further along the runway than the preceding aircraft OR The Tower Controller has reason to believe that the following aircraft will require more runway length for takeoff than the preceding heavy aircraft. The separation interval, up to three minutes, will be given by ATC when the projected flight paths of any following aircraft will cross that of a preceding aircraft.

ATC does NOT apply the two-minute spacing interval for a LIGHT following a MEDIUM but will issue a wake turbulence advisory to the LIGHT aircraft: "Caution Wake Turbulence."

The ground wait time for wake turbulence is supposed to provide adequate time to allow the vortices to dissipate. So, if you wait the required amount of time, there won't be a likelihood of a problem. Of course, the need for wake turbulence separation can occur at a non-towered airport as well. In these instances, without the benefit of ATC, <u>the pilot needs to have the discipline to wait the appropriate time prior to launch.</u>

In some but not all cases, the **<u>VFR</u>** pilot can waive the ATC wake turbulence caution and then be given an immediate takeoff clearance. There may be departure situations, such as a steady crosswind component that might blow wing-tip vortices away, where any or part of the full separation interval is not required. The pilot is in the best position to make the assessment of the need for wake turbulence separation.

However, **<u>in waiving off wake turbulence, the pilot must recognize that this situation incurs a special knowledge obligation on the part of the pilot to get the wake turbulence separation risk assessment correct.</u>** Will it be ok this time? Waiving off a wake turbulence caution is at the discretion of the pilot and cannot be initiated by the Controller. There are some circumstances where the VFR pilot cannot waive a wake turbulence caution:

- A light or medium aircraft taking off behind a heavy aircraft and takeoff is started from an intersection or a point significantly along the runway in the direction of takeoff.
- A light or medium aircraft departing after a heavy aircraft makes a low or missed approach on the same runway.
- A light or medium aircraft departing after a heavy aircraft which has made a low or missed approach in the same direction on the same runway.

For example, ATC's response to a request to waive wake turbulence separation by the VFR pilot might be: "Negative, hold short, wake turbulence heavy Boeing 747 rotating at 6,000 feet."

A pilot-initiated waiver for a VFR departure indicates to the controller that **the pilot accepts responsibility for wake turbulence separation.** The controller will still issue a wake turbulence caution with the immediate takeoff clearance.

Beside help from ATC, here are some other things that VFR pilots can do to inform themselves of risks of wake turbulence:

- Take advantage of any electronic traffic avoidance tools you have available in the cockpit to identify traffic that might pose a wake turbulence risk. ADSB-IN can inform not only of the position, altitude and speed but also perhaps the type, flight number or callsign. You can watch that HEAVY or MEDIUM ahead of you enroute or on the approach and see the preceding aircraft's position, track, altitude and speed as an aid to ensuring you don't get too close, or too low behind that preceding traffic.

- Monitor Centre, Terminal or Tower radio frequencies as appropriate to develop a good picture of the inbound and outbound traffic that may pose a wake turbulence risk. Use whatever tools you have on-board to establish and maintain situational awareness.

- When VMC, don't forget to use those "Mark 1 eyeballs" to spot larger aircraft ahead or crossing and keep a safe distance.

Finally, let's examine specific **situational tactics** that pilots should adhere to when encountering other aircraft that may pose a wake turbulence threat – whether VFR or IFR, in controlled or uncontrolled airspace. For the purpose of this section, assume there is no ATC providing wake turbulence cautions or instructions and it is fully up to the pilot to decide how to operate.

The key to these tactics is to know where and when the heavier aircraft of concern has begun or stopped generating wing-tip vortices. When airborne, the traffic ahead is always generating wake turbulence. On landing, most of the vortices STOP, when the main wheels of the preceding heavier aircraft touches down, which is often visible to the trailing pilot as a puff of smoke. Some residual wake vortices continue until the nose wheel touches down. On takeoff, the vortices from the preceding, heavier aircraft BEGIN when it rotates lifting off from the runway. The vortices technically begin when the nose wheel lifts off but the dwell time between nosewheel and the mains lifting off is very short and can be considered almost coincident. If the larger aircraft ahead has executed a low/missed approach to your runway, an intersecting runway or a nearby parallel runway when there is a good crosswind blowing, you can assume vortices will be present and should allow sufficient time for them to dissipate before commencing your flight operation.

DEPARTURES:

Note the preceding larger aircraft's takeoff rotation point and plan your own rotation WELL PRIOR to that point. Then climb to stay above the larger aircraft's climb path. The vortices from the preceding heavy aircraft tend to spread outwards in a non-crosswind situation and so should not be a big concern if you are climbing straight out.

The key challenge in this no-wind situation will be to ensure that you do indeed stay above the climb profile of the heavier aircraft ahead. This could be difficult given the much higher climb performance of modern transport aircraft when compared to that for a light GA aircraft. One mitigation tactic could be a turn away from the preceding heavy aircraft's heading. This turn should be executed before the preceding aircraft's rotation point to avoid conflicting with either that aircraft's climb profile or its wingtip vortices.

When a crosswind prevails, the situation is more complex. Of course, you will still have the challenge of staying above the preceding heavy aircraft's fast-climbing profile. But that preceding, heavier aircraft undoubtedly will have a wider wingspan than your light GA bird and its wingtip vortices will be descending and drifting with the crosswind. If you are going to try (with ATC's approval where applicable) to turn away from the preceding heavy aircraft's heading that turn must still be before the heavy aircraft's rotation point to avoid all wake turbulence encounter risk. Two questions present themselves: Which way to turn; Will it keep you out of the wake turbulence of the preceding heavy aircraft ahead?

Simplistically, it might seem that a turn upwind, towards the direction the crosswind is coming from, might be most prudent. After all, vortices coming off the preceding heavy aircraft ahead will be drifting downwind with the crosswind. But, depending on circumstances, such as the strength and angle of the crosswind combined with the much faster climb profile of the preceding heavy aircraft ahead and its wider wingspan, a turn upwind into the crosswind could put you directly in the crosshairs of wake turbulence from the upwind vortex of the heavy aircraft ahead. While it might seem counterintuitive, it may be possible that, in a crosswind situation a turn to the downwind might be preferable if the downwind vortex of the heavy aircraft ahead has drifted far enough downwind to give you more room to play with. What will you choose? Will you be lucky this time?

Instead of putting yourself into the position of having to think so much about making an immediate turn after a crosswind takeoff and requiring you to always remain above the fast climb profile of the heavy departing ahead, a better course of action might be to simply hold position on the ground a little longer and give those vortices from the preceding aircraft more time to dissipate.

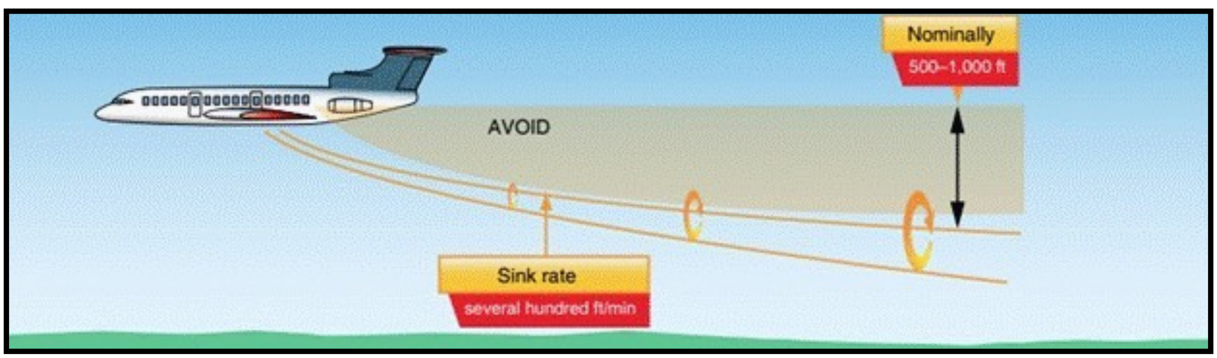
If IFR (even on a blue-sky day) and departing on a Standard Instrument Departure you may not have the option for when you turn. You might have to climb several thousand feet straight out before a turn is possible.

If the preceding heavy aircraft was landing, from your ground-hold position, note that aircraft's touchdown point and plan your own rotation point to be well beyond that point on the runway. One FAA document suggests adding a buffer of around 500' beyond where the preceding heavy landing touched down. This buffer serves to allow for the fact that the landing aircraft only completely stops generating vortices, not when the main wheels touch down but when its nosewheel touches down.

The same applies if you are planning to do a takeoff from an intersection instead of using the full-length of the runway. However, it might be wise to avoid intersection takeoffs altogether when the preceding heavy aircraft is using full-length. If the heavier aircraft has just executed a low/missed approach or a Touch & Go landing, whether to your intended runway or an intersecting runway, observe a 2-3-minute interval before commencing your own takeoff run.

VFR ENROUTE:

Pilots should avoid flight below and behind a larger aircraft's flightpath. If a larger aircraft is observed above on the same track (meeting or overtaking) adjust your position laterally, preferably upwind, as the heavier aircraft's vortices drift downwind. When crossing behind a leading, heavy aircraft try to cross above its flightpath or, terrain permitting, at least 1,000 feet below. Remember that when a leading, heavy aircraft climbs or descends through your projected flight track, vertical separation is no longer in place and a vortex encounter is possible. Similarly, use caution when climbing or descending behind other aircraft.



Source - Pilot Institute

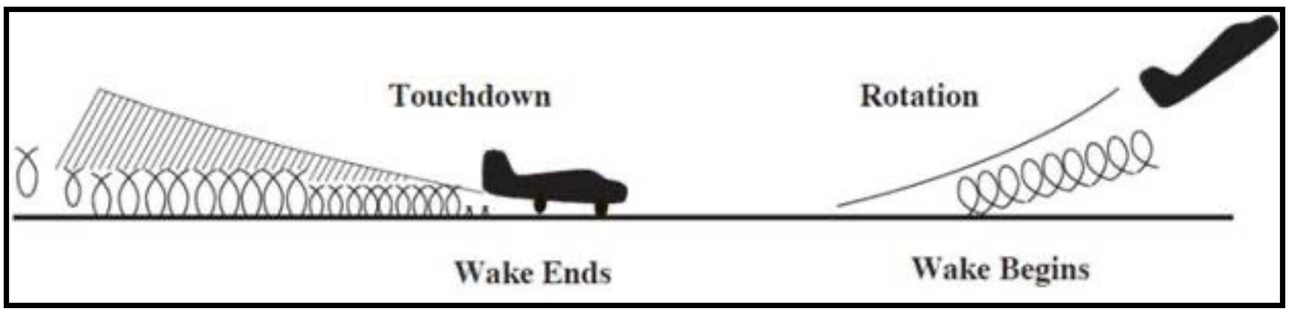
APPROACH TO LAND:

For VFR flight, remain no lower, and preferably slightly above the flightpath of the larger, preceding aircraft throughout your entire approach and subsequent landing. If extending the length of your flight path, to increase the distance behind an arriving heavy, avoid the tendency to develop a low, dragged-in final approach. If you get below the glideslope/glidepath, apply whatever pitch and power is necessary to re-establish a normal descent path. **THE LARGEST NUMBER OF DANGEROUS ENCOUNTERS HAVE BEEN REPORTED TO BE IN THE LAST HALF-MILE OF THE FINAL APPROACH.**

VFR flights doing approaches behind a preceding heavy aircraft could consider flying the glideslope one dot above normal. The professional crew flying the heavier transport aircraft below is probably flying accurately right down the glidepath, so this tactic gives the VFR pilot a little margin of protection against a wake turbulence encounter.

For IFR flights preceding heavier traffic, the normal course of action and habit is to fly the glideslope accurately and rely upon ATC to provide adequate wake turbulence separation. However, when weather is not right down at minimums, the IFR pilot has more options and could also consider flying the glideslope one dot higher, providing a little extra safeguard against a vortex encounter. Lastly, the IFR pilot flying a Visual Approach assumes responsibility for wake turbulence, cannot rely on ATC to provide adequate wake turbulence separation and should take extra care not to get too close or below the flight path of the preceding heavier aircraft. The Piper Chieftan accident cited earlier is an example of this.

LANDING:



Source - Pilot Institute

If on approach and the preceding heavier aircraft ahead is landing, note its touchdown point on the runway. This is often denoted by a puff of smoke coming off the heavier aircraft's main wheels at touchdown. Add a little to this touchdown point (maybe that FAA recommended +500'?) and execute your own final descent to remain above the preceding aircraft's descent path and touchdown beyond the touchdown point of the preceding aircraft. If the preceding heavier aircraft was taking off, note its rotation point on the runway and execute your own descent and touchdown to occur well prior that point on the runway. Apply the same procedure when the heavy aircraft ahead is conducting operations on an intersecting or closely spaced parallel runway.

Where the preceding heavier aircraft was executing a low/missed approach or Touch & Go on your runway, or an intersecting or closely spaced parallel runway, it may be best to simple abort your approach, go missed and retry after a 2-3-minute interval.

TAXIING:

Be careful when taxiing across an active runway where a heavy aircraft has just taken off, landed or conducted a low/missed approach or Touch & Go. Depending on the circumstances, holding short of the runway for an appropriate time interval may be prudent.

OTHER CONSIDERATIONS:

Take special care if approaching or landing with a tailwind or quartering tailwind. Consider that the wake turbulence from the preceding heavier aircraft may have drifted back onto the approach closer to the TDZE or may have drifted further back up the runway. Adjust your landing point for that possibility.

In the matter of ATC wake turbulence cautions: Consider waiving off your waivers! The cautions are given for a good reason, and it would be wise to adhere to them unless you are quite sure there is no risk.

If you expect to encounter wake turbulence or feel the risk is high, slow the aircraft down to Design Maneuvering Speed (Va). Hitting a roiling wake at near maximum airspeed doesn't always end well with everything intact.

If you are a passenger aboard an aircraft flying in RVSM airspace, keep your seatbelt fastened at all times. Even high-flying turbojets can occasionally experience wake turbulence encounters.

Use caution when maneuvering behind, below or near helicopters. Helicopter rotors can throw off strong, high-speed vortices, similar to that of larger, fixed wing aircraft and with a similar effect. When stationary hovering or on the ground, helicopters can generate powerful downwash and should be given a wide berth.

"Don't Cross the Wake," and enjoy safer flying!

APPENDIX 1: EXAMPLE OF LARGE AIRCRAFT BY WEIGHT-CLASS

ICAO WEIGHT CLASS	AIRCRAFT TYPE	
MEDIUM	BOEING 737	AIRBUS A320
	BOMBARDIER CRJ 900 & CHALLENGERS	
	CESSNA CITATION	LEARJET 75
	KING AIR 350	FALCON 2000
HEAVY	BOEING 747	
	AIRBUS A-340-500	
SUPER HEAVY	AIRBUS A380-800	

APPENDIX 2: SELECTED LIGHT CATEGORY AIRCRAFT BELOW 15,000 KG MTOW

SAAB 340	EMBRAER 120 BRASILIA	LEARJET 75
PILATU8S PC-24	EMBRAER PHENOM 300	BEECHCRAFT 1900D
DeHAVILLAND HERCULES	EMBRAER PHENOM 100	CESSNA CITATION
BEECHCRAFT KING AIR B100	Bae JETSTREAM	AIRBUS H160 (HELICOPTER)

Banner Towing Service at KW!

Wenjun Zheng at FliteLine (KW Airport) provides banner towing and can supply a good addition for advertising for a company or social/personal event. He can also provide special messages (you missed a birthday or anniversary, or need spousal OK to buy a plane….). Wenjun's contact information is:

Wenjun Zheng
519-514-0530 (Ext 510)
charters@fliteline.ca

MEMBERS' CORNER

Rescuing a Spitfire (Steve McDowell)
A scale-model one, anyway…..

In May of 2021, I was shocked to learn of the death of my friend Dave with whom I had lost touch. I was further shocked to be told that I was the executor for his estate. But, like many things in life, good things came out of bad. I got to know my friend's sister Dorothy and their mother Betty, two wonderful people I now consider to be friends. On an early visit with them, I happened to be wearing my Spitfire T-shirt from Canadian Warplane Heritage. Dorothy pointed to my shirt and said to her Mom, "Oh, that's just like the one we have in the basement." My ears perked up and I said, "Tell me more!"

They took me downstairs and showed me a 1/8-scale model of a Spitfire. Mom's brother Frank, though not a pilot, loved the Spitfire and, in the 1940's, built this scale model from original Spitfire blueprints

The Spitfire was made of wood and covered in thin paper that had taken a few hits from fingers not aware of the fragility. And it was pretty dusty. But the workmanship was excellent. It had a gasoline engine and wood propeller suitable for flying, and there was a compartment on the inside where wires connected to the flying surfaces still moved the controls. Mom said that Frank had flown the Spitfire with radio controls. There was no sign of a radio control unit, although I did find a covered-over port where line controls might have been attached.

What I heard next was that Mom had to move out of her house and that the Spitfire was going to be discarded. I asked if I could take it home and seek someone to restore it and put it on display. They agreed, pleased that Frank's handiwork would be preserved. I carefully loaded the treasure into my car and took it home.

I started doing some research on the Spitfire and what might be possible for preservation. It was painted with markings BS435 FY-F, an actual Spitfire from WWII. These markings honour Squadron Leader Hugo Throssell Armstrong DFC, the Australian CO of 611 Squadron and an ace with 10.5 victories, who was shot down and killed in February 1943. (A full-scale, non-flying replica of his Spitfire also exists in Britain. Search for BS435 to find available information.)

In June, I tried contacting a couple of museums directly, but got no interest. Finally, I was directed to Edenvale Aviation Heritage Foundation Museum. The EAHF Museum is known as the place where a full-scale model of the Avro Arrow resides. That museum said that the model was "too big" for their display, but they referred me to the smaller Edenvale Classic Aircraft Foundation Museum next door. The ECAF said yes, they would be interested in restoring and displaying the Spitfire. In August, I loaded it into the car again, and took it to its new home.

In the spring, I got word that the Spitfire had been restored. I visited the ECAF Museum and was quite pleased to see the restoration. Besides cleaning, repairs, and repainting, the functional wire landing gear had been replaced with more accurate tires and gear doors, the gasoline engine and propeller had been replaced with a four-bladed scale propeller, and guns had been added to the wings. The markings had changed to ZP-A in honour of South African ace Adolph "Sailor" Milan, who led No 74 Squadron RAF during the Battle of Britain.

Completed Restoration!

I was thrilled to see the beautiful condition of the Spitfire. I took pictures and sent them to Dorothy and Betty, who were pleased to see them too. If you're visiting Edenvale, be sure to stop by the ECAF Museum and see Spitfire ZP-A.

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The Arrow II Story by Dave Timms!