Non-Towered Airport Traffic Patterns

Straight-In
Versus
The Traffic Pattern

By Tom Rogers, CFI-II-MEI, NAFI Master CFI

Becoming a lethal recipe

On August 18, 2022 another traffic pattern related mid-air collision occurred in Watsonville, California with a tragic end. It is an all too familiar scenario, traffic pattern traffic versus a straight-in. A study of accident statistics reveals that 68% of all mid-air collisions in the past 20 years occur on short final. Also, of note in this review, general aviation accidents have remained very steady at approximately 5.55 per 100,000 hours flown. With Airlines at .023 per 100,000 hours and the military at .94 per 100,000 operations there is a lot of room for improvement. 100% of the traffic pattern mid-air collisions occur on clear unrestricted visibility days.

Table 2-14: U.S. General Aviation[a] Safety Data

	1960[d]	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	(P) 2020
Total fatalities	787	581	633	559	563	706	496	496	481	458	458	438	390	422	378	386	331	379	414	332
Total seriously injured persons	U	297	323	265	271	265	255	259	273	256	328	247	214	236	(R) 247	199	206	(R) 228	(R) 229	187
Total accidents[a,b]	4,793	1,716	1,741	1,619	1,671	1,523	1,654	1,569	1,481	1,441	1,471	1,471	1,223	1,222	1,211	1,269	(R) 1,234	1,275	1,220	1,085
Total accidents[a,b], fatal	429	345	352	314	321	308	288	277	276	271	270	273	221	255	230	213	203	224	233	205
Flight hours (thousands)	13,121	25,545	25,997	24,888	23,168	23,963	23,819	22,805	20,862	21,688	U	20,881	19,492	19,617	20,576	21,334	21,703	21,663	21,801	19,454
Rates per 100,000 flight hours[c]																				
Fatalities	6.00	2.27	2.43	2.25	2.43	2.95	2.08	2.17	2.31	2.11	U	2.10	2.00	2.15	1.84	1.81	1.53	1.75	1.90	1.71
Seriously injured persons	U	1.16	1.24	1.06	1.17	1.11	1.07	1.14	1.31	1.18	U	1.18	1.10	1.20	(R) 1.20	0.93	0.95	1.05	(R) 1.05	0.96
Total accidents[a,b]	36.53	6.69	6.68	6.49	7.20	6.35	6.94	6.87	7.08	6.63	U	7.04	6.26	6.23	5.85	5.93	(R) 5.68	5.87	(R) 5.58	5.57
Total accidents, fatal[a,b]	3.27	1.33	1.34	1.26	1.38	1.28	1.20	1.21	1.32	1.24	U	1.30	1.12	1.30	1.10	0.98	0.94	1.02	(R) 1.06	1.05

KEY: P = preliminary; R = revised; U = data are not available.

[a] U.S. registered civil aircraft not operated under 14 CFR 121 or 14 CFR 135. Accidents on foreign soil and in foreign waters are excluded. Suicide, sabotage, and stolen/unauthorized cases included in accidents, fatalities and rate computation in this table are: 1985 (11 accidents, 6 fatal accidents); 1990 (4, 1); 1991 (8, 5); 1992 (2, 1); 1993 (5, 4); 1994 (3, 2); 1995 (10, 6); 1996 (4, 0); 1997 (5, 2); 1998 (6, 4); 1999 (3, 1); 2000 (7, 7); 2001 (3, 1); 2002 (7, 6); 2003 (4, 3);
[b] Since April 1995, the National Transportation Safety Board has been required by law to investigate all public-use accidents, increasing the number of NTSB
[c] Rates are computed by dividing the number of *Total fatalities*, *Total seriously injured persons*, *Total accidents*, and *Total accidents, fatal* by the number of
[d] Data for 1960, 1965, and 1970 include air taxi.

SOURCES
Fatalities, accidents, flight hours and rates per 100,000 flight hours:
1960-70: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: U.S. General Aviation, Calendar Year 1970*, NTSB/ARG-74/1
1975-2020: National Transportation Safety Board, *Aviation Accident Statistics*, table 10, available at
Serious injuries:
1970-85: National Transportation Safety Board, *Annual Review of Aircraft Accident Data: General Aviation* (Washington, DC: Annual Issues).
1990-2020: National Transportation Safety Board, Analysis and Data Division, personal communications, July 1, 2010, July 20, 2011, July 18, 2012, Aug. 8,

General Aviation is About 5.5 per 100,000.
In real terms we have over 1200 accidents per year or 100 per month

Not many pilots know that the FAA re-wrote much of the guidance on non-towered airport operations back in 2017. In fact, they even changed the reference from "uncontrolled" to "non-Towered" in all publications in an attempt to change the paradigm that there were no rules at non-Towered airports. I have traveled around western Washington giving a presentation on non-Towered traffic patterns. I have given it online as well. My presentation has been reviewed and sponsored by both the Seattle and Spokane FSDO safety inspectors who run the FaaSTeam in our area.

"Since 1978, there has been an average of 30 midair collisions in the United States each year. These collisions resulted in an average of 75 deaths per year. There are also over 450 Near Midair Collisions (NMACs) reported each year; no one can calculate the number that have gone unreported!" FAASTeam Notice July 2011

Let's talk about just one element of the non-Towered trouble areas: Straight-in versus the traffic pattern. According to Advisory Circular 90-66B Non-Towered Airport Operations; the Pilot's Handbook of Aeronautical Knowledge (PHAK); the Airplane Flying Handbook (AFHB); and the Aeronautical Information Manual (AIM), the primary method for landing at a non-towered airport is the standard traffic pattern. The sum of all aeronautical information, written by thousands of experienced pilots strongly recommend pilots use the standard traffic pattern. That is no small statement. It is the safest way to land at a non-towered airport and statistics bear this out. If you use the traffic pattern you will be statistically speaking, at least 50% less likely to be involved in a mid-air collision, perhaps even more.

There are reasons for the straight in approach on a VMC day. Emergency or cautionary approach, practice instrument approaches, large Turbojet aircraft making visual approaches from the enroute segments, and well to save time by not having to go out of your way to enter the traffic pattern. If I could convince you to stop doing that fourth justification for a straight-in, we would eliminate more than 80% of the traffic pattern versus straight-in conflicts.

In the Watsonville accident mentioned previously, the straight-in aircraft was doing over 190kts during the entire VFR approach making it impossible for the low time Cessna 152 pilot to judge distances or closure. I flew F-15s in the USAF and only made a final approach more than 190kts once when a flight control issue required a 230kt approach. The speed was excessive, but it was with-in rules.

What I would like pilots to understand is that practices which are "within the rules" may still be wrong. The aviation "rules" or CFR 14 parts 61, 91 and all the others, are intentionally written with a wide margin so that a wide variety of operations can be considered. To narrow the best practices down, the other publications; AIM, PHAK, APFB, and Advisory Circulars, share thousands of years of pilot experience in your specific operations. To say they are not mandatory may be legally correct but counter to safe, professional operations. I can assure you that when you are dead from a mid-air collision your last thought will most likely not be I was legally correct. One last thought on these "not mandatory" rules. I had a conversation with the aviation insurance underwriter's association in 2021 when I was researching much of this subject. They told me that because of all the red ink from the accident rates in General Aviation, insurance companies are beginning to write policies with a "best practice" clause in them. In other words, if you are found to have not been following best practices found in all the guidance mentioned above, your loss may not be covered in the future.

That leads me to the troublesome subject of Right-Of Way. CFR 14 Part 91.113 (g) is probably the most quoted and least understood FAR there is. I'm going to quickly break it down for you but remind you that you don't want to be dead right when it comes to exercising your right of way.

> **91.113 Right-of-way rules: Except water operations.**
>
> (g) ***Landing.*** Aircraft, while on final approach to land or while landing, have the right-of-way over other aircraft in flight or operating on the surface, except that they shall not take advantage of this rule to force an aircraft off the runway surface which has already landed and is attempting to make way for an aircraft on final approach. When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right-of-way, but it shall not take advantage of this rule to cut in front of another which is on final approach to land or to overtake that aircraft.

"On final approach to land or while landing", Let me defer the discussion of "On final" for a minute. "While Landing" has been officially interpreted by the FAA to mean "In the Traffic Pattern". So, aircraft in the traffic pattern have right of way over aircraft not in the traffic pattern or "in flight". "Aircraft at lower altitude has the ROW" but shall not take advantage to cut in front of another. And the other biggie here "Or to overtake that aircraft". So, you may not cut in front, even if you are lower on approach and you may not overtake an aircraft in

front of you on final or in the traffic pattern. Those are the coveted "Rules" which many pilots like to point too, but seldom really understand.

What is "on final". Well, there we get back to a hole in the rules. There is no definition. One hapless pilot named Fekete tested the system, by claiming that since he was in the traffic pattern and straight-ins were not, he had ROW. That issue was not in dispute, but the FAA took notice in 1994 when on multiple occasions he turned inside of straight-in traffic causing them to go around or drastically alter their flight path. They violated Mr. Fekete and the NTSB law Judge upheld the violation and revocation of Mr. Fekete licenses for two reasons. First, he did not give way to aircraft "on final" that were lower than he, and second (CFR 14 Part 91.111) he was operating his aircraft so close to other aircraft as to cause a collision hazard. The FAA v Fekete caused a bit of a stir in general aviation. It is clear that Mr. Fekete took things too far, but now who had ROW traffic pattern or straight-ins? And what exactly is "on final". In the Fekete case the judge choose not to define "on final" but instead said that if base to final traffic made an aircraft on straight-in alter their course or go around to avoid a conflict, that the base to final traffic is in violation of FAR 91.113 (g).

To the legal eagles out there the "rules" fail both parties, the straight-ins and traffic pattern. We are left with best practices, experience, and courtesy.

Before I quickly sum this up, two areas cause mid-air collisions on final (68% of all mid-air collisions). Extending or wide downwind patterns leading to long finals. This causes a conflict when another aircraft in the pattern flies a normal pattern and does not recognize that an aircraft flew wide and long. The second is the pattern turning onto the straight-in. <u>In both cases one aircraft is on a "long final" and the other is on a short base.</u>

Since this article is getting too long to publish, I will bullet point my recommendations to avoid the straight-in vs pattern conflict in the NON-TOWERED environment. .

1. If not a jet or practicing instrument approach use the traffic pattern.
    a. If you are a Jet announce it, so the solo student understands you are much faster.
2. If practicing an instrument approach use distance references that even a solo student pilot will recognize. (i.e., not fix names)
    a. Make sure to call out how the approach will terminate in VFR solo student terms.
    b. When planning a low approach, If an aircraft is approaching normal base go around early to help.
    c. Be accurate with distance calls.

3. Reduce opposite direction approaches to an absolute minimum.
    a. Planes on upwind have NO OPTIONS to avoid your opposite direction approach.
    b. If you circle to active runway begin early to avoid crosswind traffic.
    c. If you circle below TPA you may not use the lower altitude to cut off TPA traffic or overtake TPA traffic. Remember that solo student has absolutely no idea what you are doing. Do NOT direct other aircraft's patterns so that you may accomplish your circle unimpeded.
    d. In Western Washington area use KOLM. the tower will almost always approve opposite direction approach to 17 circle to 08. There are more eyes watching for safety.
4. Straight-ins often say "traffic permitting". This seems courteous but do you have a plan to avoid the traffic pattern aircraft? At what point do you determine "traffic permitting" and what is the basis to determine "traffic permitting"? If you are just hoping for the best, in aviation that gets you an accident.
    a. Be accurate with distance calls.
5. Turning base can be safely accomplished when abeam the aircraft on final. Extending further widens and lengthens the pattern decreasing safety.
    a. If you must extend downwind beyond the normal 45 degrees off the numbers, to fit behind final traffic announce, "extending downwind for final traffic".
6. When can you safely turn inside of a straight-in or practice instrument approach traffic?
    a. Absolutely depends on the speed of the traffic.
    b. For similar GA aircraft with approach speeds of 70-90kts if you are turning a normal ½ mile to 1 mile base you may do so if traffic is <u>outside</u> 3 miles.
    c. If it is jet or twin traffic with speeds above 100kts use <u>outside</u> of 5 miles.
    d. These rules of thumb are for NORMAL ½ to 1 mile base if you constantly fly longer bases, first consider that those wide patterns are causing many of the mid-airs each year and second schedule a refresher with a CFI.
7. Play NICE around non-Towered airports.
    a. Extend courtesy toward other pilots and do not try to expedite your approach to the determent of others.
    b. Towered airports are driving both IFR and VFR practice to non-Towered airports.
    c. DO NOT bring the towered airport normal practices to the non-towered airport.
        i. No downwind departures
        ii. No base entries
        iii. No direct entries to downwind, use the 45.

That’s my two cents, try to break the accident chain early with preventive measures.

Over and out.