



Is Flight Training Safe?

Flight training is safer than motorcycle riding, skydiving, and general aviation flying in general.

You don't need statistics to understand that travelling over a hundred miles an hour thousands of feet in the air with tanks of flammable fuel is potentially dangerous. If you have not yet perfected your skills, it's doubly so. But how dangerous? For that you need statistics. Where statistics are concerned, it seems there is a compulsion to pick a position, then select the numbers that confirm your position.

I give flight instruction every day. I'd like to think my job is not that dangerous. I have a bias in writing this piece to minimize the risks. You are invited to read the piece critically and draw your own conclusion about my logic. If you do that, I have done my most important job, to get you to consider the risks you undertake every time you get in an airplane as an instructor or student pilot.

When you work with numbers, the definitions of what is being counted are more important than the numbers themselves. The ways events are counted reflect underlying – and often unstated – beliefs about the field of study. Therefore, a review of definitions is important before we discuss the numbers.

Accident

Accident – Both the NTSB and the FAA describe an accident as an event that occurs between the time people board an aircraft with the intent to fly and when they disembark. That event includes either major damage to the airplane or injuries other than broken fingers, toes, or noses. You can look up the definition in NTSB Part [830](#). That's pretty clear. Most compilations of data do not include events that were the result of terrorism or intentional suicide. It is not altogether clear that FAA or NTSB statistics are complete in the accident arena. One insurance company, Avemco, tells us that only a quarter of its claims show up in the NTSB database. The damage from the event was substantial enough to warrant a claim, but for whatever reason, it was not reported to the government.

Fatality

Fatality – the FAA and NTSB are both clear about what a fatality is. It is a death that occurs during an event, or within thirty days of the event. It's likely that the counts of aviation fatalities in the U.S. are fairly accurate, so for the rest of the piece, I'll concentrate on that.

Risk

Risk – risk is the ratio of events to some measure of exposure. For example, we can describe fatal accidents per year per 100,000 pilots, or accidents per 100,000 hours of flying. Whenever you hear a risk statistic, look first at the denominator. Look carefully. Take the two risk measures above. If we describe a population of 100,000 pilots, are all these pilots flying? Are they doing the same work? Piloting a medevac helicopter is more dangerous than flying a Piper Cub. If the measure is per 100,000 flying hours, who knows how many hours are flown? In the airline business, the number of hours flown is relatively easy to calculate. In general aviation, we use some surrogate measures, like the number of gallons of avgas consumed nationally. But no one really knows.

The accident count, pilot population, and number of hours flown are all subject to question. If the same definitions are used from year to year, however, you may not have an accurate measure, but the trends show up just fine – as long as the definitions don't change. When definitions change, or the data collection methods change, then the trend numbers are quite useless.

Bureau of Labor Statistics

The BLS reports that in 2008, 87 aircraft pilots and flight engineers died on the job. That puts piloting at number three most hazardous, behind commercial fishing and logging.

Occupation	Fatalities 2008	Fatalities per 100,000 population
Commercial Fishermen	38	111.8
Loggers	76	86.4
Pilots and Flight Engineers	87	70.7
Steel Workers	40	45.5

The BLS numbers include people who are on the job. That includes flight instructors. We are part of a risky group. Within the group of pilots, though, are instructors likely to be a fatality? The good news is no. If anyone trots out the BLS statistic for you, smile quietly.

National Transportation Safety Board

The NTSB counts instructional accidents including both dual training flights and student solo flights. Over the decade ending in 2006, instruction suffered 17 to 34 fatal accidents each year. The data does not differentiate student solo accidents which, obviously, would include only one fatality, and those involving dual instruction, which may include one or more deaths.

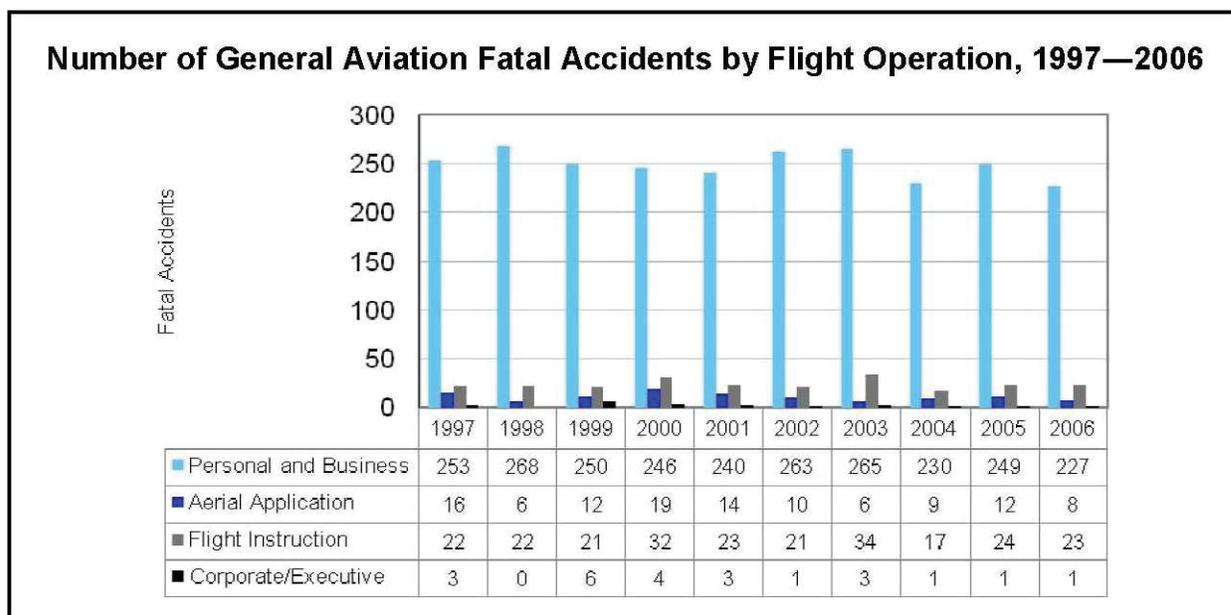


Figure 11. Annual numbers of fatal accidents for each major category of general aviation flight operations.

In comparison to other general aviation operations, the risk of flight instruction is relatively low. It is significantly lower than personal business flying and crop dusting. It is massively more dangerous – by a factor of ten or twenty – than corporate flying.

How you slice the data makes a big difference. The same underlying data is analyzed by the AOPA Aviation Safety Foundation.

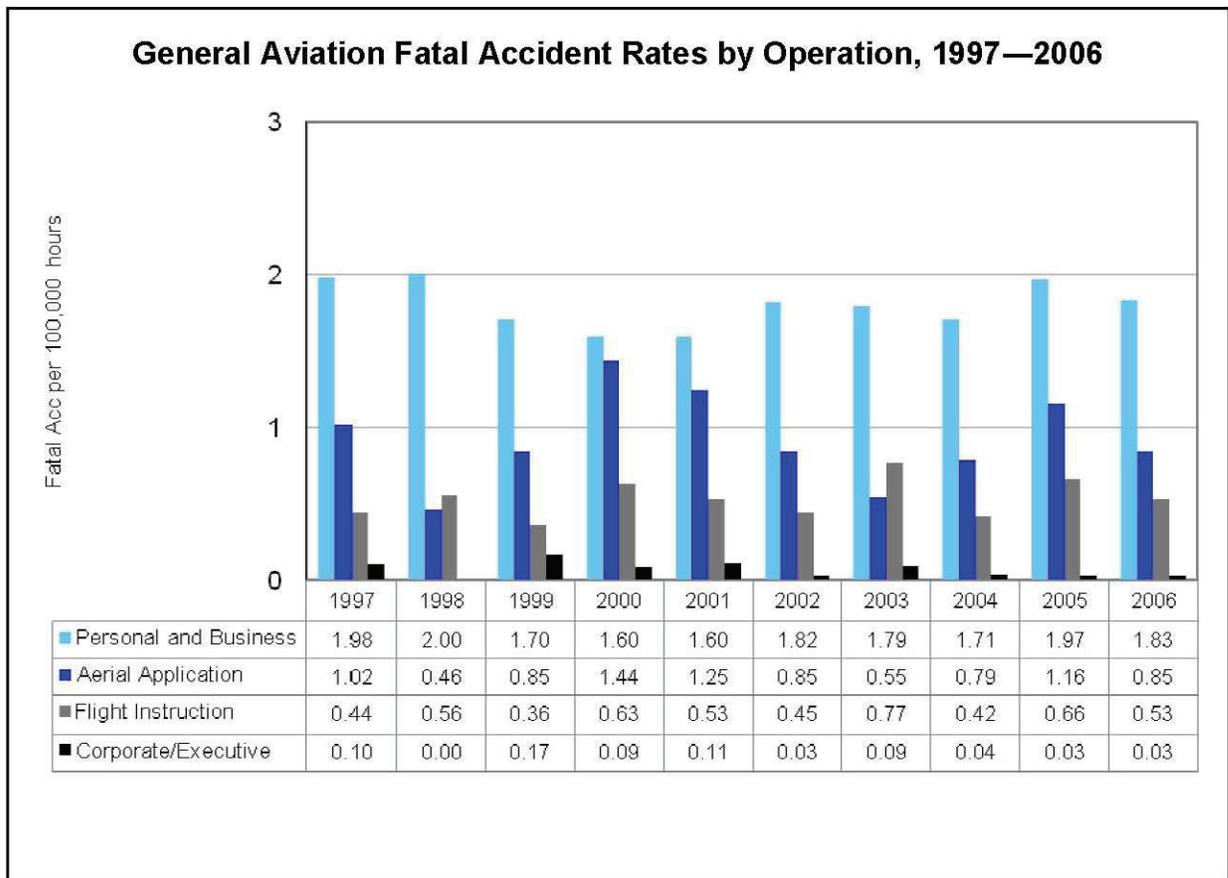


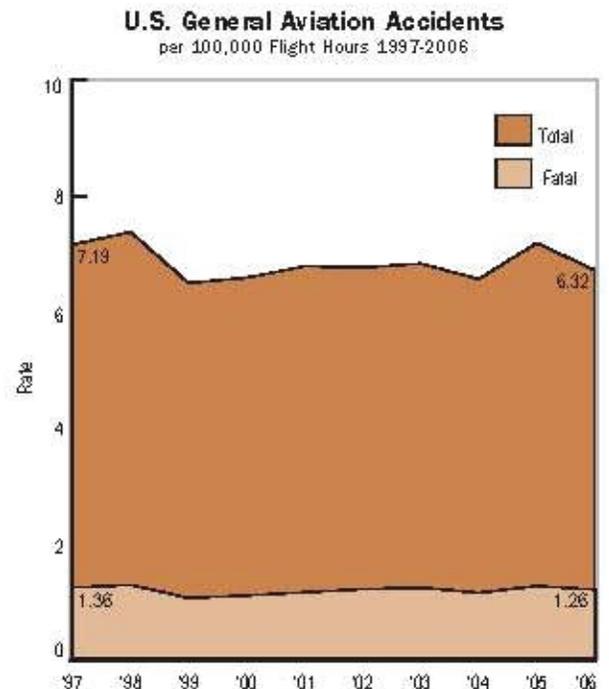
Figure 9. Fatal accident rates per 100,000 flight hours for the major categories of general aviation flight operations.

Nall Report

Each year the AOPA Air Safety Foundation analyses the NTSB data. In 2006 the Nall report identified 18 fatal instructional accidents in fixed wing aircraft, which resulted in an unspecified number of fatalities. ASF uses the same definition of instructional flight, but doesn't count helicopters. ASF does not focus on the number of fatalities per occurrence. My review of 2006 showed 2.005 fatalities per fatal accident.

A look into the details

You can look at the numbers yourself. I did, by going to <http://www.nts.gov/aviationquery/index.aspx>. I dumped a report of all Part 91, instructional, fatal accidents from 2001 to 2010. There were 214 reports. From that I eliminated helicopters. There remained 190 reports. Then I eliminated amateur-built aircraft, leaving 175 accidents. What surprised me was the number of accidents with multiple fatalities.



2001 -10 Fatal Part 91 instructional accidents, certificated airplanes, fatalities per report				
1	2	3	4	5
51	332	66	40	5

Then I asked myself, what were the characteristics of the single-fatality accidents? Assuming that the NTSB statistics are correct, twenty-four fatal accidents involved a single pilot. Five accidents involved a fatality, with the other occupant uninjured. The balance, twenty-two, had two occupants, one of whom was killed and the other injured to some extent.

Over ten years, then, there were twenty-four pilots killed in certificated airplanes while flying alone on instructional flights. On an annual basis, that's about two and a half student pilots lost. In my book, that is pretty low, an acceptable risk for people who wish to experience the joy of flight and get a license. It's a tenth of the number when an instructor is involved, and a fortieth of the annual rate for certificated pilots ("personal and business"). What makes solo student flight so safe? Perhaps it is because the risk is managed well. The student needs to plan the flight. The instructor needs to approve it. And, perhaps, the chief pilot okays the approval.

Nevertheless, any loss of a pilot or passenger is a tragedy. So how should we interpret this data? There are two major questions: What are the trends? How does instructional flying compare to other recreational activities?

The Trend in Flight Training Accidents

The trend in flight training accidents reflects the trend in general aviation. It's been flat for years, meanwhile, passenger travel and charter has been getting safer and safer. What could this possibly mean?

- General Aviation is getting safer, but more accidents are being reported.
Not likely. The fatal accident count is probably reliable over the years.
- Pilots, mechanics, and airplane manufacturers are getting better, but flying is more complicated.
Possible, but one would expect the causes to change. They don't.
- It's the same as it's always been.
Very likely. .

There is some percentage of the pilot population that is risk tolerant. These folks fly with less fuel than they need, they fly with substandard maintenance, and they fly in weather conditions that may be beyond their capabilities. They may not seek recurrent training to hone their skills. Most importantly, they do not accurately assess the risks of a flight before they take off.

Can these people be identified before they come to grief? Allstate Insurance shows financial risk-taking is a reliable indicator of loss in auto and homeowners policies. They have this to say:

"People who are more likely to take risks are more likely to get into serious financial difficulties (bankruptcies, liens, foreclosures, etc.) than those who are more risk averse. People who are more likely to take risks are also more likely to get into auto accidents. Therefore, some people with poor [credit] scores are more likely to engage in risky behavior and thus more likely to incur losses."

You may not buy the credit score/risky pilot argument. You can read the Allstate testimony by clicking [here](#). While the relation of credit score to automobile accident losses is well documented, it's nowhere near as strong as the relation of credit score to homeowner's losses. What does that say? I don't know.

Unless we select the pilot population before they start flying – as the airlines and military do – there probably isn't much we're going to do to change human nature and the percentage of risk takers in the population.

Comparison to other activities

Motorcycle riding

The Insurance Information Institute parses federal statistics and arrives at the following

MOTORCYCLIST FATALITIES AND FATALITY RATES, 1999-2009

Year	Fatalities	Registered motorcycles	Fatality rate per 100,000 registered vehicles	Vehicle miles traveled (millions)	Fatality rate per 100 million vehicle miles traveled
1999	2,483	4,152,433	59.8	10,584	23.46
2000	2,897	4,346,068	66.66	10,469	27.67
2001	3,197	4,903,056	65.2	9,639	33.17
2002	3,270	5,004,156	65.35	9,552	34.23
2003	3,714	5,370,035	69.16	9,577	38.78
2004	4,028	5,767,934	69.83	10,122	39.79
2005	4,576	6,227,146	73.48	10,454	43.77
2006	4,837	6,678,958	72.42	12,049	40.14
2007	5,174	7,138,476	72.48	13,621	37.99
2008	5,312	7,752,926	68.52	14,484	36.67
2009	4,462	NA	NA	NA	NA

NA=Data not available. Source: U.S. Department of Transportation, National Highway Traffic Safety Administration; Federal Highway Administration.

Skydiving

Everyone has an interest to promote his or her sport. As you review the chart below, you need to be aware of the definition of a skydiving fatality. It's not the same as the NTSB or FAA. A skydiving fatality is counted only after the jumper exits the aircraft. From the time he or she boards the aircraft until jump time, accidents are not counted as skydiving accidents, but as aviation accidents. Over the last few years, skydiving aviation accidents (jump plane crashes) have claimed as many lives as the jumping.

Fatalities per Total Jumps			
Year	Skydiving Fatalities in U.S.	Estimated Annual Jumps	Fatalities Per 1000 Jumps
2010	21	3.0 million	0.007
2009	16	3.0 million	0.005
2008	30	2.6 million	0.012
2007	18	2.5 million	0.007
2006	21	2.5 million	0.008
2005	27	2.6 million	0.010
2004	21	2.6 million	0.008
2003	25	2.6 million	0.010
2002	33	2.6 million	0.013
2001	35	2.6 million	0.013
2000	32	2.7 million	0.012

Comparison to other activities

To compare motorcycles to airplanes to skydiving, we need to develop a common denominator, the exposure. What I propose seems reasonable to me; you can change the numbers to suit yourself. Perhaps you want to include the airplane ride in the skydiving rate.

Occupation	One Exposure	Fatalities per 100,000 exposures 2006
Flight Instruction	One hour	.53
Motorcycle Riding	33 miles	1.33
Skydiving	One jump	.8
Personal & business Part 91 certificated airplane	One hour	3.66

What does that mean to the flight student? If it takes sixty hours to earn a Private Pilot certificate, then you have, on average, one chance in 3000 you die in training. If you survive flight with your instructor, then your solo flight is relatively risk-free.

What you need to worry about is the next hundred hours, once you've earned your Private certificate. If you maintain the same safety standards you did when you were a student, you will live a long and happy life. If not, and you forget everything you learned, then you are at risk.