

## SUICIDE BY GENERAL AVIATION AIRCRAFT: IS PUBLIC SAFETY AT RISK?

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Analyses of the National Transportation Safety Board's aviation accident data were made for 1983-1998 to discern those caused by suicide during flight in general aviation and to determine if the public is placed at risk by them. It was found that suicides were about 0.06% of the accidents and that about 1.4 occurred per year. The characteristics and predisposing circumstances of the crashes are described. Most crashes were into mountains, hillsides or bodies of water. Public property was rarely damaged and no injuries to the public were recorded. Based on these data the public is at little risk from suicides in general aviation aircraft.

### INTRODUCTION

In 1998 there were about 30,575 suicides reported in the U.S., and it was estimated that there may have been about three quarters of a million attempts, so that there are about 25 attempts for each one that succeeded (Murphy, 2000). Suicide deaths are about 1.3% of deaths in the U.S. Vehicles are used in some of these, notably motor vehicles which are involved in about 1% of all suicides.

Information about suicides involving the use of General Aviation (GA) aircraft is not readily available. A few case studies (e.g. Jones, 1977) have been done to look at these acts in depth. Another type of study done for the period 1979-1989 looked at both the National Center for Health Statistics data and those from the National Transportation Safety Board (NTSB), but found few cases interpreted as suicides that appeared in both data sets. The NCHS data found 10 fatalities attributed to crashes of aircraft and another 20 cases of "undetermined intention." The NTSB data showed that 9 fatal crashes were attributed to

suicide in GA aircraft out of a total of 5929 in the ten-year period that was investigated. Those data suggest that there was at least about one suicidal crash per year, with perhaps another two at most, if the "undetermined intention" crashes are included. Those represent about 0.17-0.51 suicidal crashes per 1000 GA crashes.

A review of 415 GA crashes in the United Kingdom (Cullen, 1998) found that there were 3 cases that could be clearly identified as being suicides and another 7 in which suicide was not ruled out as a cause. Those data indicate that about 0.7% - 2.4% of the cases involved suicide which is about 40 times more than the U.S. data of Ungs (1994).

It is to be expected that, because most General Aviation aircraft are small and have six or fewer seats, suicides involving GA aircraft cause few fatalities or injuries to the occupants other than to the pilots. Suicidal pilots may also choose to inflict damage to property and to other persons, thus placing them at risk. An example of this was illustrated shortly after "9/11" by a flight student who did not wait for his instructor to join him in the

cockpit, but took off and flew the Cessna 172 into the 28<sup>th</sup> floor of the Bank of America building in Tampa, Florida. He caused little damage other than to the airplane and to himself. However, he managed to cast a shadow over general aviation as the media took advantage to speculate about the dangers posed by pilots in small aircraft bent on suicide and possible terrorism.

This paper is concerned with the involvement of general aviation aircraft in suicides in the U.S. between 1983 and 1998. One purpose is to determine if the fears for the safety of the general public may be justified based on past actions of suicidal pilots.

## METHOD

The National Transportation Safety Board's aviation accident data were used in this analysis. The data were for the years 1983 to 1998 for which computerized crash data were available. The accidents involving aircraft operated under Federal Aviation Regulations Part 91 were filtered out from the others to obtain the general aviation cases. The narratives of those accidents were searched for the word "suicide" as a causal factor of the crash. The case histories of those accidents were then reviewed in detail in order to determine if suicide was the cause of the crash.

## RESULTS

There were a total of 41,938 general aviation accidents in the 16 years, 1983 to 1998, for which data were analyzed. There were 25 cases of general aviation aircraft in flight in which "suicide" was a possible or probable cause. Cases in which the aircraft was not airborne, such as if a person intentionally walked into a propeller, were not included. Another case involved a crash which the pilot survived and was not included as a suicide in the final analysis. Another case did not involve a crash of the aircraft because it was the passenger who departed the airplane at 5000'. That case has been included in the data that follow because it is a case of intentional use of a small airplane for the purpose of suicide.

## Weather and Light Conditions

Only one case was in IMC (Instrument Meteorological Conditions) but that aircraft was flying below the overcast as he buzzed the area and was effectively in visual conditions (VMC). About 65% of the events were in daylight with the others at night or dusk.

## Types of Aircraft

Most (80%) of the aircraft were small, single engine airplanes with fixed gear. Three were retractable gear, high performance, single engine airplanes, one was a twin engine airplane and one a helicopter.

## Objects Struck

Mountains, hills, fields and other terrain were most often (64%) struck by the aircraft in the crash. A lake, ocean, river and a frozen reservoir were struck by 20%. Trees were the final site of 8% of cases. An unused fuel storage tank was struck by one pilot. The only object struck that may have resulted in injuries to others was the one case in which the airplane struck a house. No injuries were reported. Another pilot took off, climbed to about 400', and with the runway still beneath him dove the airplane into the runway. That was the only case in which the crash occurred at an airport.

By comparison, 44% of all the crashes in the period, 1983-1998, were at an airport. A random sample of 53 non-suicide cases showed that 42% were at an airport, 11% were near an airport, 23% struck mountains, hills or fields, 6% water, 11% powerlines, 4% trees, and 2% had a mid-air collision.

## Alcohol or Other Drugs

Four pilots, one of whom survived, had consumed alcohol, one marijuana and another two a prescription drug.

## Underlying Causes

There were numerous underlying problems faced by those persons in the sample which are summarized in Table 1.

Table 1. Underlying Personal Problems That Were Identified.

<u>Problem/Cause</u>	<u># of Cases</u>
Legal, police action, conviction	4
Psychological problems, depression	5
Marital, other deteriorated relationships	4
Business, financial	2
Medical	2
Employment	2
Public embarrassment	1
Shot spouse, shot self in aircraft	2
Intended suicide but changed mind (injured)	1
Previous suicide attempts	2
<u>Told others of intention to commit suicide</u>	<u>4</u>

Table 2. Sources that Determined the Event was Caused by Suicide

<u>Source*</u>	<u># of Cases</u>
N, M, A	4
N, A	12
A	3
N, M, A probable	2
A probable	1
M, A probable	1
N, A, aborted suicide	1
<u>N, A, not suicide</u>	<u>1</u>

\* N denotes NTSB, M - medical examiner, A - author

## Determination of Suicide as a Causal Factor

The narratives of each case were assessed by the first author to determine if the event resulted from an intentional suicide or from another cause. In addition, the NTSB's or a medical examiner's mention of suicide as a cause was also used. In

some instances the assessment of the NTSB's examiner and a medical examiner's assessment were available, in some just one of those and in some neither (Table 2).

Table 2 shows that there were only 4 cases about which the author concluded that a suicide or a probable suicide had taken place which were not also reported by the NTSB or a medical examiner. There was also one case about which both the NTSB and the authors were in agreement that the case did not involve suicide.

## Left Note of Intention or Other Communication

There were 10 persons who left a note or message of some kind to others of their intention to commit suicide. There were another two persons who had threatened to commit suicide in the past, one person who told a friend shortly beforehand of the intention and another one who survived the crash and told the accident investigators of his intention and, hence, was not a suicide.

## DISCUSSION

In all these 25 cases the pilots chose good visibility, suggesting that the pilots had some control over their suicidal tendencies and that they wished to be sure to crash the aircraft in a specific manner and place. It is also true that neither the aircraft used in most of these cases nor the pilots were equipped for instrument flight.

Mountains, hills, cliffs, other terrain and water were the favored objects (84%) to be struck in these final flights. One house was struck by one aircraft, but there was inadequate information provided to determine if it was selected for any special reason. No injuries were reported to persons on the ground, which strongly suggests that these cases did not pose an intentional threat to persons on the ground.

Alcohol was found in the post-mortems of 3 cases. The blood-alcohol levels were indicated to be between about 0.11% and 0.18%, which are definitely impairing but, when compared with the mean level of about 0.18% found in drivers in fatal motor vehicle crashes, are moderate to high. Two

pilots had residues of prescription medicines (Coumadin, Prozac) and one had a low level (0.006 mcg/ml) of marijuana. Thus, in this sample of aviators alcohol, illicit or prescribed drugs were found in six cases. Canfield et al (1995) found that about 8% of pilots in fatal GA crashes had ingested alcohol above 0.04%, and Kuhlman et al (1991) found that about 23% of their cases had used drugs. The suicidal pilots in this study used alcohol and drugs in a similar proportion.

The causes of suicide are varied and complex. In this sample of civilian pilots the underlying causes were similar to those of US Air Force aviators (Patterson, 1988) and involved legal problems, failed relationships, psychological disorders, employment conflicts, and some substance abuse, mainly alcohol.

The data of 25 general aviation suicide events indicates that one case is not a suicide based on the NTSB and our analyses. Another tried to abort the suicide, too late to avoid a crash but was able to survive. Our analysis also shows that 3 cases are probable suicides, although neither the NTSB or a medical examiner ruled them suicides.

Overall then, we are confident that 16 cases are suicides based on NTSB, medical examiner and our analyses, with 4 additional cases considered suicides by NTSB or a medical examiner and probable suicides by our analyses. Therefore, there is good agreement on 20 cases of suicide or probable suicide. There were an additional 3 cases that our analyses concluded to be suicides but which lacked NTSB or a medical examiner's diagnosis.

One of those cases involved a pilot who had a fight with his girl friend and later told others he intended to kill himself. Another had done low level buzzing of various dockyard installations until flying into an abandoned fuel storage tank in a twin engine airplane. The third failed to return from a flight over the Gulf of Mexico and had left a note suggesting suicide.

Therefore, this sample of 25 cases contained 23 cases in which suicide was most probably involved. One case, mentioned earlier, that did not end as a suicide was a pilot who had been drinking and tried to recover from a dive and who later admitted he had planned suicide. Another case that we did not classify as suicide involved a crash while doing low level maneuvering. The spouse of the

pilot thought he was despondent but there was no other evidence of suicide.

Our data suggest that there were 23 suicide cases that were successfully completed. This means that out of the 41,938 general aviation accidents in the 16 year period of the study, about 0.06% were suicides and there were about 1.4 such cases per year. General aviation aircraft are very rarely used for the purpose of committing suicide and inconsequential damage and apparently no injuries were sustained by the public. If the past is prologue, the public is at a very minor risk from this type of event.

## REFERENCES

- Canfield, D. Fleming, J., Hordinsky, J.J. & Birky, M. (1995) Drugs and alcohol found in fatal civil aviation accidents between 1989 and 1993. Report DOT/FAA/AM-95/28, Office of Aviation medicine, Washington, DC.
- Cullen, S.A. (1998). Aviation suicide: a review of general aviation accidents in the U.K., 1970–1996. *Aviation, Space & Environmental Medicine*, 69, 696-698.
- Jones, D.R. (1977). Suicide by aircraft: a case report. *Aviation, Space & Environmental Medicine*, 48, 454-459.
- Kuhlman, J.J., Levine, B, Smith, M.L. & Hordinsky, J.R.(1991). Toxicological findings in FAA general aviation accidents. *J. Forensic Sciences*, 36, #4, 1121-1128.
- Murphy, S.L. (2000). Deaths: Final data for 1998. *National Vital Statistics Report*, 48, (11), Department of Health & Human Services, Publication (PHS) 2000-1120.
- Patterson, J.C. (1988). Suicide and suicide attempts: USAF aviators. Meeting of the Aerospace Medical Association, New Orleans, Louisiana.
- Ungs, T.J. (1994). Suicide by use of aircraft in the United States, 1979-1989. *Aviation, Space & Environmental Medicine*, 65, 953-956.