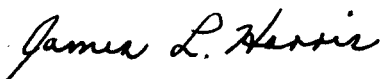


# THE PREDOMINANT CAUSES OF CRASHES AND RECOMMENDED THERAPY

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## THE PREDOMINANT CAUSES OF CRASHES AND RECOMMENDED THERAPY

Close scrutiny of the causes of recent general-aviation fatal crashes reveals that there is a wide discrepancy between the accident rate (number of accidents per takeoff or per flight hour) and the actual risk of flying. The accident rate is about 20 times greater than the risk of flying because of the following considerations.

For purposes of this paper, we shall restrict our comments to fatal general-aviation accidents, although there is often a hairline between a fatal and a nonfatal accident. If we were to consider all general-aviation accidents, we would necessarily give attention to the large numbers of ground loops and other errors in landings. Increased pilot proficiency is a clear preventive here.

Depending upon the source of statistics and the specific nature of the definitions, 5% to 15% of other than minor general-aviation accidents include such causes as structural failures not related to flight loads, invisible weather phenomena, etc. This small percentage is a credit to the products of the aviation industry. Of the remaining 85% to 91% of the accidents, the bulk occur largely through horseplay, foolishness, and lack of respect for nature.

It is within this large latter category that we will find an opportunity to reduce the annual accident toll. A reduction in accidents can be expected to yield an enhanced growth in general-aviation activities (for one thing, fewer accidents produce a lower cost of flying).

With rare exception, each fatal accident is the end result of a chain of circumstances, each link setting the stage for the connection with the next link.

The following information bearing upon these links is based upon that used by the Civil Aero-medical Research Institute in its portion of the CAB-FAA National Aircraft Accident Investigations School, operated on a continuous basis at the Aeronautical Center in Oklahoma City, upon that contained in the documents listed in the

Selected References, and that gathered by the author and his associates during on-site accident investigations.

Three major categories of accident causes, followed by an example of official 1964 CAB terminology are given below:

1. *Horseplay* (Unrestrained Exuberance)—“Unwarranted Low Level Flying.”
2. *Foolishness*—“Impaired Efficiency and Judgment of the Pilot, Caused by the Consumption of Alcoholic Beverages.”
3. *Lack of Respect for Nature*—“Noninstrument Pilot Attempted Continued Visual Flight in Adverse Weather Conditions.”

Has not every pilot had an urge to tempt fate and cut a safety corner? All human activities carry some risk, and it is upon this point that we focus attention: How can we cut the risk to a minimum while increasing the freedom and pleasure of flying?

The word “doctor” is derived from Latin and means “to teach.” Physicians “teach” health, and, thus, it is incumbent upon the flight surgeon, the only repetitive point of contact for licensed pilots with a representative of the FAA, to call to the attention of pilots that a continued state of good health is directly related to safe operating practices from the human-factors standpoint.

Aviation Medical Examiners, through concentration and succinct brochures, can disseminate “eye-opening” information concerning the avoidable circumstances that precipitate general-aviation accidents.

Each pilot should be aware of the inseparable nature of mind and body. Physical illness, pronounced fatigue, toxic ingesta and absorbables, and hypoxia temporarily derange body function and, hence, affect mental function.

The main determinant in the accomplishment of a successful flight is the capability of the pilot to “command” the airplane subsequent to the exer-

cise of judgment and the arrival at a decision. The mind accomplishes these events, relying upon experience and knowledge. When the body is suffering from one or more of the above factors, the mind is adversely affected and its command capability deteriorates.

Some readers may feel that the above is obvious, but the accident "probable causes" and contributing factors listed by the CAB show otherwise. Physicians have found that the simplest dictum of health ("all things in moderation") bears frequent repetition.

The state of mind can influence the body, which in the final sequence of flight control effects the actual manipulation of the aircraft. Acquired lower-order reflexes have saved more than one aviator and his craft under sudden adverse circumstances. The mental "override" of emotional disturbances (panic, depression, euphoria, self-destructiveness) can nullify the efficacy of such reflexes. In fact, such disturbances can create and allow the establishment of a flight condition from which the "fastest reflexes in the world" can be of no avail (for example, a low-level "buzz job" carried to the point of no recovery).

Emotional disturbances can lead to alcohol consumption just prior to flight (the alcohol may be used to remove fear). On the other hand, alcohol itself can produce an emotional disturbance (euphoria plus an absence of fear) that leads the pilot to undertake unsafe flight practices (for example, to make his first night flight—not infrequently accompanied by a nonpilot friend who has similarly imbibed).

The evidence indicates that man's nature has changed little in the past 4,000 years. His literature and art today resemble in plot and gross principle that of centuries ago. The change has been in man's institutions.

Enhanced training and attitude inculcation offer means by which fledgling pilots may be better fitted to avoid established aerial perils (in the same fashion that seasoned mariners teach junior personnel to avoid known navigational hazards of the sea). This activity of necessity is aimed at, and depends upon, the instructors.

For pilots in general, the Aviation Medical Examiner, through his recurrent contacts, can re-emphasize human-factors concepts. The FAA, CAB, State Aeronautical Officer, private aeronautical associations (NPA, NBAA, AOPA, etc.), university aviation departments, and other groups

must meet the challenge of disseminating these safety concepts. The Flight Safety Foundation (New York City) has undertaken a program jointly supported by the FAA to provide additional grass-roots educational material to pilots (Project GAPE: General Aviation Pilot Education).

The approach, thus, is to study individual accidents and from the total picture of each accident define the causes. In the case of the current accident situation, the individual is the key to its resolution. The individual must practice self-discipline relative to (1) the desire to take horseplay into the skies; (2) the temptation to do obviously foolish things; and (3) the susceptibility to ignore Nature's tangible atmospheric signs of warning.

Beginning with the first days of civilization, man has found that certain regulations are necessary. It may be that certain "dissuading" new regulations may be brought about by a relatively modest number of overall pilots. This will be largely determined by the pilots themselves and the degree of success of the education programs.

Here a suggestion is made for the pilot at the controls who feels his enthusiasm on the verge of running over: get instruction in a different type of aircraft or in a new and challenging maneuver and practice assiduously.

Perfectly performed lazy-8's, chandelles, spot landings, and on-pylon turns are examples of maneuvers with which most private pilots have difficulties. The constructive nature of the flights, plus the developing pride of proficiency, will help evolve a better pilot.

Additionally, each pilot should try to fly every week, even if for just a pattern or two, and strive for new ratings (especially IFR). An annual instructor-proficiency ride will detect unconscious bad habits. The above are proven aids to safety as shown by the high number of total accidents (fatal and nonfatal) experienced by (1) the "rusty" pilot and (2) the "professional student."

During the evening, especially on trips when the pilot is grounded due to weather, some time can be spent refreshing one's knowledge of such subjects as meteorology. A constant traveling companion should be a set of succinct flying-information booklets.

In conclusion, the following three points should be stressed in conversation and through brochure

material available through AME offices, airports, pilot magazines, etc.:

1. Piloting aircraft during times of emotional distress can lead to unwarranted low-level and other unsafe maneuvers.
2. Piloting aircraft during the period immediately following alcohol consumption is extremely hazardous (due to the elimination of fear and to deterioration of psychomotor performance).
3. Continued flight into deteriorating weather by a VFR pilot results in the possibility of graveyard spirals ("get-there-itis" leads to early membership in the "chapter eternal").

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