The Truth About Drunken Flying: Part II

FAA **Statistics** Ouestioned

In Part I of this two-part AOPA PILOT exclusive, the author contrasted FAA's 'drinking pilots' claim with CAB official findings. Evidence in Part II indicates accuracy of FAA study may not meet scientific standards

■ Investigation into the claim that ingested ethyl alcohol plays a larger role in general aviation accidents than heretofore suspected, as maintained by the FAA's Office of Aviation Medicine, turned up a considerable amount of evidence that casts doubts on the accuracy of the FAA "findings."

The December UPI story that triggered this investigation said of those pilots killed in the "alcohol involved" accidents:

"These were the pilots who failed to appreciate the fact that flying may be relatively simple, but it is still 'ten times more complicated than driving a car,' Mohler said." (Dr. Stanley R. Mohler of FAA's Office of Aviation Medicine.)

Exactly how is the conclusion reached that flying is 10 times more complicated than driving an auto? In a tape-recorded interview, Dr. Mohler (AOPA 167639) explained his method for arriving at this figure.

He used his own 1963 model sedan with automatic shift and compared the items listed in the owner's handbook against the items listed in the flight manual of a 1964 Piper Comanche. He found 80 "sequential action" items in the airplane manual, versus eight in the auto handbook. These driver/pilot actions were required to drive the car around the block or fly the plane around the traffic pattern, according to Dr. Mohler.

by DUANE E. BEST / AOPA 195750

"The only way we can document it," says Dr. Mohler, "is to take the owner's manual and list the challenging task operations of one and compare it to the other. I just went right through the owner's manual and ticked them off."

This method divorces the result completely from the context in which each type of manual is written. Aviation's emphasis on flying safety is reflected in the aircraft checklist's attention to detail, including preflight and postflight inspections. "Sequential actions" of this nature are never contained in automotive owner's handbooks.

If the automotive industry were as safety oriented as aviation, the auto owner's handbook would contain many more detailed "challenging task operations" which, on the basis that this comparison was made, might make flying seem far less complex than driving an automobile.

No one will deny that flying is in some ways more complex than driving. Yet in some ways it is also easier. Most will agree that flying is a fast, relaxing way to travel when compared to the usually hectic, risk-ridden task of automotive travel. Even Dr. Mohler says, "I think, I'm more rested at the end of a cross-country trip when I've flown than when I drive."

Consequently, one must reject the attachment of any scientific validity to using flight manuals and automobile owner's handbooks as a method to compare the relative complexities of flying to driving. As with the questionable alcohol figure, this puts those manuals to a use never intended.

Despite the weakness in the FAA method for determining that flying is "10 times more complicated than driving a car" (a statement guaranteed to frighten away many prospective aeronautical students), FAA medics have transferred these conclusions to their "alcohol involved" findings. Alcohol, in the eyes of the public, therefore has been related as a killer in aviation far out of proportion to what the factual evidence supports from actual study of accident case files.

Seldom has a single cause been determined by the Civil Aeronautics Board to be the sole reason for an aircraft accident. When "alcoholic impairment of efficiency and judgment" is assigned, it usually is in association with other causative or contributory factors.

Frequency of occurrence of causes most often associated with alcohol accidents, versus frequency of occurrence of these same causes in the nonalcohol accidents, is depicted in Figure 1. These are 1965 fatal accident statistics showing, in numerically ranked order, causes and factors by frequency of occurrence, based on published CAB findings. Two causes/factors, "alcoholic impairment of efficiency and judgment" and "exercised poor judgment," are listed as one, because both reflect on the pilot's thinking. This list by no means includes all causes/factors; only those which occurred most frequently.

No appreciable difference exists between FAA's "alcohol involved" cases when compared to the rank-order of causes/factors in all general aviation fatal accidents. Considerable incongruity does exist, however, when accidents in which the CAB lists "alcoholic impairment" are compared to this same norm.

If one eliminates the "alcoholic impairment of efficiency and judgment" which occurs in every CAB alcohol case except those labeled "alcoholic incapacitation," the most frequently recurring cause is "unwarranted low flying." Next comes "continued VFR flight into adverse weather," which is ranked first in all other columns.

Pilots receiving CAB's "alcoholic impairment" determination had trouble in judging speeds, altitudes, distances and clearances which didn't show up among the top seven causes/factors in other columns. Accidents resulting from failure to maintain or obtain flying speed ranked fifth among drinking pilots while it rated second in all other columns. This is not necessarily because the drinkers had proportionately less stall/spin accidents but more likely is due to a disproportionately larger number of other accident causes/factors.

In FAA's "alcohol involved" accidents, unwarranted low flying is in fourth place, and failure to see and avoid objects and obstructions, ranks seventh. This may indicate FAA is not totally wrong, although no significant correlation exists between FAA and CAB figures.

One must be careful not to conclude that small amounts of alcohol will not impair performance. Because there are so many variables, it is nearly impossible to pinpoint at what level and when an individual's faculties may be impaired.

There have been medical studies that show the human nervous system has an ability to adapt to alcohol in the body. These studies show that subjects' scores on various types of tests tend to recover rapidly when blood-alcohol levels are on the down-swing, as opposed to erratic scores when blood-alcohol levels are rising.

One such study was done by researchers Newman and Abramson at Stanford University's School of Medicine. Subjects were scored on an eightminute test of aiming a rifle at a moving target. Blood-alcohol levels peaked at about 75 mg% (five beers) at $1\frac{1}{2}$ hours. Test scores dropped from 150 to 95 at the one-hour point, then rose to 145 at $2\frac{1}{2}$ hours as blood-alcohol levels tapered off to 70 mg%.

Their summary states: "The presence of alcohol in the body over a period of several hours effects a change in the response of the nervous system to alcohol, with the result that concentrations which initially produced drunkenness no longer are capable of showing this effect. Thus the effect of a given concentration of alcohol depends not only on its absolute value but also on how long a time it has been present in the body."

Dr. R. N. Harger, an authority on alcohol and its effects, has written, after reviewing numerous studies on this "adaptation" ability, that these studies show "essential agreement in one respect, namely, that all subjects are impaired with a blood alcohol level above 0.10% [100 mg%] even though the level is falling." (Italics are Harger's.)

From FAA's "alcohol involved" accident statistics one may conclude (as detailed in the first article) that something which tests like alcohol shows up in approximately one-third of all toxicology examinations performed. In a surprising number of cases, however, this is believed to be due to some form of error in testing or interpretation of data rather than ingested alcohol.

Testing and interpretation errors cover a wide range of possibilities. Many cases of actual or possible contamination due to putrefaction, embalming, aviation fuels, agricultural chemicals and fire were found. Any of these factors can cloud or distort blood-alcohol test results.

Amounts low enough to be well within the magnitude of blood-alcohol test errors also were found. In many reports, medical laboratories had labeled the test results "not significant." Yet FAA chose to include these cases in their data.

Inclusion of such interpretations into the published statistics has stacked the deck and apparently helped mislead FAA doctors to conclude that pilots are treating their planes like their cars; drinking and flying just like they drink

FIGURE 1

Rank Order Of General Aviation Fatal Accident Causes/Factors, 1965

All Fatal General Aviation Accidents (Total 504)	Top Seven Fatal Accident Causes/Factors Ranked By Frequency of Occurrence in Each Category	Top Seven Excluding Those Determined by FAA or CAB to Involve Alcohol (Total 398)	Top Seven Among Those Determined by FAA to Involve Alcohol (Total 104)	Top Seven Among Those Determined by CAB to Involve Alcohol (Total 38)
1	Continued VFR flight into adverse weather	1	1	3
2	Failed to obtain/maintain flying speed	2	2	5
3	Alcoholic impairment of efficiency and judgment or exercised poor judgment	4	3	1
4	Mechanical factors (not assigned to pilot in com- mand)	3	5	Section Section
5	Inadequate preflight preparation and/or planning	5	6	End at
6	Unwarranted low flying	6	4	2
7	Spatial disorientation	7		
*	Failed to see and avoid objects or obstructions		7	6
*	Misjudged altitude/speed/distance/clearance			4
	Alcoholic incapacitation			7

* Although rated low on overall cause/factor scale, these items were among top seven in CAB alcohol-involved accidents.

and drive. It is doubtful that this philosophy actually exists among general aviation pilots.

A random sampling of fixed-base operators in different parts of the country reveals that without exception the problem posed by drinking pilots is so minor that most FBO's don't feel it necessary to instruct employees on how to handle such cases should they arise.

When asked if he was aware of any one- or two-beer pilots, Cecil Booth, who for years has helped manage the Wichita, Kan., Municipal Airport, said, "I don't know of a single instance where there has been any trouble at all and I know quite a few of the pilots around here. That is one thing that everyone I know is pretty careful about. They all realize that altitude and alcohol don't go together."

At Albuquerque's Sunport, Sid Cutter of Cutter Flying Service, says, "I would say it is such a rarity that we don't even look for it. Over the years we have on only one or two occasions made a call to FAA to see if they could get some guy stopped."

Asked what he would do if he suspected an outbound pilot to be intoxicated, Cutter replied: "I've told my boys to run out and park a gas truck in front of them or something, but you've got to be awfully sure you are right."

When asked how far a person could go to stop someone from flying if he appears tipsy, John S. Yodice (AOPA 199738), AOPA's Washington Counsel, had this to say:

"If a pilot has had one or two drinks and he doesn't appear to be intoxicated, even though we would prefer not to have him fly, I don't think there is any justification for taking obstructive action to prevent him from flying his own airplane.

"However, if his speech is slurred and his walk is unsteady, then I would try to stop him from flying, including taking his keys and preventing him from moving his airplane, on the reasonable assumption that once he does sober up he is probably going to be appreciative."

Queried about the legal consequences of taking such obstructive action, Yodice replied, "We are in a gray area, as one might figure. If a man is physically restrained, that, technically, is 'battery.' If the keys to an airplane are taken, that's theft. But I can't imagine a prosecutor bringing that type of charge or a person who was intoxicated bringing a civil suit on such a claim. Such a case to my knowledge has never happened. I would not hesitate to take reasonable measures to prevent a man from flying while he was drunk—but I wouldn't have much legal protection."

Asked if there had ever been problems arising from the use of alcohol during AOPA's annual Plantation Parties, J. B. Hartranft, Jr., AOPA president, said it had never been a problem since overnight fly-ins were first started in 1939 even though today over 2,000 people attend annually. He could recall only one incident involving alcohol. In that case, the pilot was dissuaded from flying before reaching his airplane at the airport.

"If drinking and flying were factually known to be a problem of the slightest significance, AOPA would be the first to seek very definite corrective action," Hartranft said. "Our interest isn't only altruistic because every one of our member-pilots is insured by us."

Of the intense ground and flight instructional activity that is an integral part of Plantation Party programs, Hartranft says, "If we had an operational problem stemming from liquor, it would certainly have come up from the instructors in our debriefing sessions and we would have had to take some sort of policing action on it. Even with free access to liquor and dawn instructional flights we don't consider it a problem at all."

In Dallas, Tex., Southwest Airmotive's Al Harting was asked if he had ever noticed any alcohol problem. Said Harting, "I've been here 20 years and to my knowledge there has been no problem. Pilots who frequent an airport like Love Field are very conscientious about the way they conduct themselves and I think they deserve some compliments rather than criticism."

To get a medical opinion, Dr. George B. McNeeley of Bloomington, Ill., was asked to comment on what he found in his medical practice. Dr. McNeeley is a pilot and a senior FAA aviation medical examiner who is also active in the space medicine branch of the Aerospace Medical Association. He examines about 1,000 pilots annually, from students to ATR's.

Dr. McNeeley says of the drinking pilot: "He does exist but I don't have concrete evidence to give you. From a practical standpoint, if a man has one drink I don't want to fly with him, but I don't think it's a prevalent problem. At least I'm not impressed with it in my practice.

my practice. "As far as I'm concerned," Dr. Mc-Neeley emphasized, "the major problem, especially among private pilots, is the inability to understand weather. Weather problems are much more important in aviation today than those caused by alcohol."

Numerous FBO comments about the existence of drinking and flying problems paralleled those of Harry J. Lehman (AOPA 60768), who operates Beacon Flying Service at Hyde Field near Clinton, Md. Lehman said, "Because of the way our field is operated, we don't have any of it at all. It doesn't happen here because, to start with, the field's owner doesn't allow any drinking on the field. It's up to us as managers to see that his wishes are carried out and we do that quite thoroughly."

On the Pacific Coast, Hillsboro Aviation at Hillsboro, Ore., revealed the same attitude. Manager Art Klosterman said, "It's no problem. We control our planes so closely that I don't think anybody could make it through. I'm sure if that kind of thing did happen, a guy would be pretty sure to hear about it through idle conversation, if nothing else." In reference to the FAA "alcohol involved" statistics, Klosterman stated, "That has certainly not been our experience here."

Chuck Colgan (AOPA 272766) of Colgan Airways at Manassas, Va., states flatly, "We just don't tolerate it. It's a hard thing to detect but I wouldn't think of letting a man have an airplane if I suspected he'd been drinking. It hasn't been a problem with us at all. We have 237 student pilots on our rolls and expect to graduate 100 private pilots this year. I know the statistics on alcohol in aviation accidents are supposed to be pretty high but I would have to disagree with them from our experience."

Significantly, not once, at any level of the industry was anyone found who did agree from their own experience with FAA's declaration of alcohol as a problem among general aviation pilots.

In Washington, D.C., Floyd M. Drury, who handles the various AOPA insurance programs, said, "Naturally, any insurance man is disturbed at any type of claim and particularly when alcohol is involved, but from an insurance standpoint I haven't been alarmed. I take a dim view of any pilot flying who has been drinking and I'd have him grounded or anything I could do," Drury advised. "But I have yet to see a pilot in command take a drink or be drinking and I've been around a lot of airports over the years.

"The outmoded image of daredevils with leather jackets and goggles in their flying machines is still very much with us," Drury continued. "I think this accounts for the public's 'I told you so, it's not safe!" attitude toward a few flying accidents which are caused by alcohol, while the highway slaughter by drunk drivers kills thousands and is generally ignored. These things which the FAA announces don't help our cause either."

Drury concluded with the significant fact, "We've got about \$200,000,000 in insurance coverage on our members and we're certainly not alarmed about this alcohol hazard. I feel that this whole thing has been blown up all out of proportion."

When asked whether any discussion of the drinking pilot problem occurred at AOPA Flight Training Clinics that are held in all parts of the nation, AOPA Foundation project director Don Uhlenberg (AOPA 263395), said, "I think the only real contact we have with it is what we read. Statistics are the only thing on which we really have any information. We talk about aviation problems with clinic pilot-students but this topic rarely comes up."

Several state aviation officials were queried about what they encountered in their own states. In Little Rock, Ark., the Executive Director of Arkansas' Department of Aeronautics, Jimmy W. Woodward (AOPA 117196)—whom many will remember from his recordsetting *Apache* flight with one prop removed and stored in a bank while he circumnavigated the state—gave us the benefit of his experience. Says Woodward, "I do not think drinking is an excessive problem. I'm sure it does exist and we don't want to sit back and relax and say that it doesn't exist. We must be vigilant and keep reminding people.

"We like to think," Woodward continued, "that the average pilot is of a little higher mentality than the average auto driver. I can't say positively that this is true but I do believe it is just from personal observation. Yet we can't relax. We must constantly be on the alert for these problems.

"From our department's standpoint I don't feel that drinking is a factor in flying which merits much concern at this time. I feel like most of our pilots have more sense than that."

Charles Murphy, Director of the Texas Aeronautics Commission, called attention to the fact that Federal criminal laws about the use of an aircraft are similar to those for an automobile, while penalties imposed by FAA generally have something to do with suspension or revocation of a license. This leaves a void at the state level which Murphy anticipates will eventually result in state legislative action to make a pilot criminally chargeable for misuse of an airplane. This has not occurred yet, claims Murphy, because the problems-including intoxicated pilotshaven't occurred that are necessary to get the public moving through the legislatures.

"In politics, it has been my experience," says Murphy, "that it just takes one rather dramatic accident to touch off a wave of demand by the public to get something done."

Clyde P. Barnett (AOPA 236619), Director of Aeronautics for California, passed along his views of the pilot drinking problem from a state that contains twice as many active airmen and aircraft as any other.

Says Barnett, "I think that release by FAA on drinking pilots was a most unfortunate thing and a serious twisting of basic facts and figures. When put into context we don't have a drinking problem anywhere near the numbers that they seemed to indicate. At least we don't have a drinking problem in California if I am to compare my statistics with theirs. We keep track of every accident report and we are not running anywhere near the reported average.

The general public is using this sort of thing against us very effectively," Barnett continued. "At mass meetings in the Bay area on hearings for the establishment of a new little airport called India Basin, just three miles from downtown San Francisco, local groups who were against it used the figures by Dr. Mohler in a very effective way and asked, 'Why should we stand still for pilots being forced on us when half of them are drunk?' This makes great newspaper headlines.

"India Basin is only a proposal at the moment. When you start having community meetings on it these are the things that the public picks up and uses against us. They almost knocked us in the head with that one. We have



The relation between concentration of alcohol in the blood and the rate of consumption. When a given quantity of alcohol is taken within 30 minutes blood-alcohol level rises much more rapidly and higher (broken curve) than when approximately the same quantity is consumed at 30minute intervals over a four-hour period (solid curve). In this study the 163 grams of ethyl alcohol (2.15 grams/kg of body weight) were diluted to 20% by volume with water. (See references: Haggard, Greenberg, and Cohen.)



FIGURE 3

no answer to it. I think FAA is a little off base to put out a thing like this."

A blood-alcohol measurement from a fatal accident victim is not very meaningful by itself. If the quantity is large, it may indicate that the individual was under the influence of alcohol. If small, there is no way to determine without the aid of other knowledge whether that individual might have been impaired, or even if the substance was actually ingested ethyl alcohol.

As a living human ingests alcohol, the blood-alcohol level rises sharply. This is depicted in Figure 2. When ingestion of alcohol ceases, the bloodalcohol curve peaks, then starts a gradual decline toward zero.

The rate at which the body rids itself of alcohol, primarily through oxidation by the liver, remains relatively constant. There is nothing one can do to accelerate this process.

Writing in a toxicology textbook, Dr. R. N. Harger, of the University of Indiana, says, "The average disappearance rate for [alcohol in] man is about 100mg/kg/hr. The extremes reported range from 55 to 186." This average works out to a rate of one ounce of pure alcohol (a two-ounce martini) every $4\frac{1}{2}$ hours in a 160-pound man. For a 200-pound man the time would be about $3\frac{1}{2}$ hours.

At these rates, a 160-pound man may reasonably expect his blood to show traces of alcohol more than eight hours after consumption of two martinis. If misfortune befell him in his airplane eight hours after drinking (including mechanical failure) he would become an FAA "alcohol involved" statistic. To ascribe any scientific reasonableness to this seems absurd.

Figure 2 depicts the consumption of about 53⁴ ounces of pure alcohol, or 11¹/₂ highballs. From Figure 3 (an extrapolative extension of Figure 2), one can see that it takes about $28^{1}/_{2}$ hours from the time drinking started to rid the body of this amount of alcohol. If a pilot really ties one on, he should not fly at all the following day. The effect of hangover, too, remains an unknown factor in possible impairment.

What should pilots really know about alcohol? When and how does it impair performance? Dr. Mohler has explained the effect of alcohol on the human nervous system in a way worth remem-

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bering. He explained that with the first drink, alcohol starts to penetrate the neurons, or nerve cells. It causes "neuronal noise," which the doctor likened to the static in an early model radio when placed in a highly moist environment. This nerve static increases with each increase in alcohol resulting in message interruptions to and from the brain, causing lessened efficiency in vision and hearing; impaired coordination of muscles; lengthened reaction time and deterioration of judgment and self-control.

Hypoxia has an equivalent effect because the neurons cannot store oxygen. Consequently, exposure to altitude plus a concentration of ethyl alcohol in the body has a compounded effect on a pilot's abilities. Experiments at the Civil Aeromedical Research Institute (CARI), according to Dr. Mohler, have shown that pilot performance scores start to deteriorate with the first drink.

In Oslo, Norway, E. G. Aksnes of the Royal Norwegian Air Force's Institute of Aviation Medicine conducted experiments on performance of experienced pilots in an ANT-18 Link trainer while using alcohol. Due to the complicated nature of the tests, Aksnes cautions about drawing too positive conclusions. But he says of the tests that they:

. confirm that blood-alcohol of about 0.05% [50 mg%] lowers the ability to execute a skilled test, and seemed to indicate that even much lower bloodalcohol can lower performance in some cases. This will, of course, be dependent on the individual's sensitiveness to alcohol, and the effects seem to be less noticeable in the steadiest fliers. As one knows the lack of oxygen . . . hunger and fatigue can increase this effect [of alcohol] further. The tests do not make it possible to set any definite bloodalcohol as minimum threshold for the effect of alcohol. . . . They point out that one must be prepared for a lowered ability to perform with 0.02% [20 mg%] blood alcohol."

Sum and substance of this is the message: don't drink and fly.

In December an FAA official, after seeing general aviation representatives' unhappy reaction to the release of the "alcohol involved" statistics, asked AOPA's senior vice president, Max Karant (AOPA 18), "Would you be opposed to medical people doing a scien-

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tific study like this, based upon absolutely accurate, incontrovertible scientific evidence?"

After a long, careful look at FAA's "absolutely accurate, incontrovertible evidence" and after talking with people about this subject, nationwide, one can only conclude that FAA's information is not accurate, incontrovertible or scientific. It has been misleading and has caused needless injury to general aviation interests. It is impossible to separate ingested ethyl alcohol (even if that were true in every case cited) from accident causal implications and this is an area that by law belongs to CAB (now the National Transportation Safety Board).

No one denies that there is an occasional alcoholically impaired pilot but he is a far more rare birdman than FAA would have us believe. Efforts by responsible aviation interests to enlighten that micro-minority who may drink and fly to the hazards of their ways will continue.

Meanwhile, our faith in the ability of FAA to accurately pinpoint significant problems of concern to the aviation industry has been shaken. One can only wonder if this is an isolated instance. Now, general aviation must pass back to FAA's Office of Aviation Medicine that proverbial bundle of switches so unceremoniously dumped on our doorstep at Christmas.