

accident prevention program

MEDICAL FACTS FOR PILOTS



U.S. Department of Transportation
Federal Aviation Administration
Washington D.C.

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INTRODUCTION

Just as your aircraft is required to undergo regular checks and maintenance, you are also required to undergo regular medical examinations to ensure your fitness to fly. The physical standards you are required to meet are minimum standards. You do not have to be a superman to fly. Many defects can be compensated for, as, for example, wearing glasses for visual defects. You may be required to demonstrate by a medical flight test that you can compensate for any other defects of potential significance to flight safety.

Student pilots should visit a Designated Aviation Medical Examiner and determine if they meet the standards before spending much money taking flying instructions.

It should be recalled that humans are essentially earth bound creatures. However, if we are aware of certain aeromedical factors, and pay attention to these, we can leave the earth and fly safely. What follows will not be one hard comprehensive lesson in aviation medicine. It will point out the more important factors with which you should be familiar prior to flying.

Modern industry's record in providing reliable equipment is very good. When the pilot enters the aircraft, he becomes an integral part of the man-machine system. He is just as essential to a successful flight as the control surfaces. To ignore the pilot in preflight planning would be as senseless as failing to inspect the integrity of the control surfaces or any other vital part of the machine. The pilot himself has the sole responsibility for determining his reliability prior to entering the cockpit for flight.

General Health

The person who, for whatever reason, does not feel well should not attempt to participate as a pilot in flying activities. General discomfort, whether due to colds,

indigestion, nausea, overwork, lack of sleep, worry or any other bodily weakness is not conducive to safe flying. Perhaps the most insidious and common of all conditions that can result in dangerous inattentiveness, slow reactions, and confused mental processes is *excessive fatigue*. Marked fatigue is as valid a reason for cancelling or postponing a flight as an engine which is found unacceptable during an operations check.

Sick Pilots are ...



... Poor Pilots !

Self-medication can be a very hazardous undertaking for pilots. Probably the best general recommendation for flyers is *abstinence* from all drugs when flying is anticipated. In some instances, the need for a particular drug or medication is an indication that the pilot's health is such that flying is automatically precluded. In other cases, it is unlikely that a pilot who is ill enough to require a drug would be well enough to fly by time the chance of toxicity from the drug has disappeared. Antihistamines, tranquilizers, reducing pills, barbituates, nerve tonics and many other over-the-counter drugs can be lethal to the pilot in flight. It is best for those in doubt about such medication to consult a doctor.

Hypoxia (oxygen starvation) affects everyone. Its danger lies in its lack of pain or other symptoms of discomfort. ALWAYS breathe supplemental oxygen above 12,500 feet.



Hypoxia

In simple terms, hypoxia is the result of insufficient oxygen in the blood stream. Many are prone to associate hypoxia only with flights at high altitude. While it is true that there is a progressive decrease of oxygen with an increase in altitude, there are many other conditions or situations which can and do interfere with the blood's ability to carry oxygen to the brain. Many drugs, alcohol, and heavy smoking will either diminish the blood's ability to absorb oxygen or the ability of the brain to tolerate hypoxia.

Because of wide individual variations in susceptibility to hypoxia, it is impossible to predict exactly when, where, or how hypoxia reactions will occur in each pilot. As a general rule, however, flights below 10,000 feet MSL without the use of supplemental oxygen can be considered safe, though night vision is particularly critical, and impairment of sight can occur at lower altitudes - especially for heavy smokers. The onset of hypoxia is insidious and progresses slowly. Impaired reactions, confused thinking, poor judgement, unusual fatigue, and dull headaches are typical reactions. Sometimes there is a sense of "well-being" characterized by high spirits or by the feeling that "things could not be better" (euphoria), but the individual thus involved may have little or any insight into his or her actual condition. Because of this and because many pilots never experience this false, happy, carefree feeling, it is not always a symptom one can rely upon to warn of an active or incipient hypoxic condition.

Fact: Breathing too rapidly (hyperventilation) can cause the same symptoms and incapacitation as hypoxia.



Hyperventilation

Hyperventilation is simply a matter of breathing too rapidly. This condition probably occurs with greater frequency among student pilots than is generally recognized. It is seldom completely incapacitating but it does produce one or more of the symptoms, noted later, that are disturbing if not alarming to the uninformed pilot. Therefore, it only aggravates the problem by further increasing anxiety, and thus the breathing rate.

Under conditions of stress and anxiety, a person's body reacts automatically to such stimuli whether the danger be imaginary or real. One of these automatic reactions is a marked increase in breathing rate. This results in a significant decrease in the carbon dioxide content of the blood. Carbon dioxide, of course, is needed to automatically regulate the breathing process. The common symptoms of this condition are dizziness, nausea, hot and cold sensations, tingling of the hands, legs, and feet, sleepiness and finally unconsciousness. Many of these symptoms are also common to hypoxia and to some ordinary airsickness.

It may be that many students who feel dizzy, lightheaded, or grow nauseated on their early flights are suffering from hyperventilation as well as from motion sickness. Both students and instructors should be aware of this possibility. This condition can be relieved by consciously slowing the breathing rate. Talking loudly or breathing into a bag to restore carbon dioxide will effectively slow the breathing rate.

Fact: Cigarette smoke contains about 4% Carbon Monoxide. At 10,000 feet, a person who averages one package of cigarettes daily will have the same oxygen requirements as a nonsmoker at 14,000 feet.



Carbon Monoxide (CO)

Carbon monoxide, always present in fumes from the internal combustion engine, is a colorless, tasteless and odorless gas. Even minute quantities breathed over a long period of time can have serious consequences. Its effects can be cumulative and are not easily corrected. A breath of fresh air will not bring early relief - several days may be required to completely rid the body of carbon monoxide. This gas has the ability to saturate the blood's hemoglobin and prevent the absorption of oxygen. The brain and body tissue must have oxygen to function and survive. Aircraft heaters designed to utilize the heat of engine exhaust gases are the usual source for this insidious danger. Be wary if there is a smell of exhaust fumes, especially if mental confusion, dizziness, uneasiness or headaches follow. If such symptoms develop, shut off the cabin heater, ventilate the cabin to the maximum extent possible, descend to lower altitude where need for heat is less critical, and land as soon as possible for a thorough check of the source of the trouble. It is wise to then consult a doctor. Remember it may take several days to rid the body of carbon monoxide.

Though there are several types of relatively inexpensive detectors available today which may warn of unsafe conditions with respect to carbon monoxide in the cabin, they may not always be completely reliable, and their use should not lull one into a sense of false security.



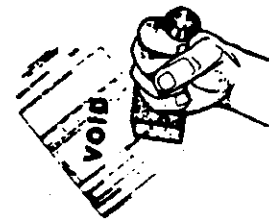
DON'T IGNORE CO SYMPTOMS !!

Fact: Night vision deteriorates rapidly above 5,000 feet. Your landings and takeoffs will be sharper and night flying much safer if supplemental oxygen is used at night *from the ground up.*



The presence of carbon monoxide results in hypoxia which will affect night vision in the same manner and extent as hypoxia from high altitudes. Even small levels of carbon monoxide have the same effect as an altitude increase of 8,000 to 10,000 feet. Smoking several cigarettes can result in carbon monoxide saturation sufficient to effect visual sensitivity equal to an increase of 8,000 feet altitude.

Fact: Your medical certificate is legally invalid during any period of illness that prevents you from performing your flying duties properly.



Fact: Drugs and flying do not mix. The side effects of most medications can be disabling in the air. If illness or pain requires treatment, you are probably not capable of peak flying performance.



Alcohol

There is only one safe rule to follow with respect to combining flying and drinking - *don't*. Alcohol consumed by a person is consumed metabolized at a fixed rate by the body. This rate is not altered by the use of coffee or other popular "quack" remedies. Hangovers, whether masked by aspirin or other medication, are included in the preceding admonition about flying.

Recent medical investigations of general aviation accidents indicate that alcohol has been a factor in a significant number of aircraft accidents. The inherent danger in drinking and flying apparently has not impressed some pilots. Possibly they labor under the deadly delusion that flying after a few drinks is no more dangerous than driving while in the same condition. (Even this would be a false assumption since drinking is involved in about half the fatal auto accidents investigated.)

We must first accept two simple truths. First, flying an airplane is more complex than the two-dimensional demands of driving a car. Second, increased altitude multiplies the intoxicating effect of alcohol on the body.

For all practical purposes, only the brain gets "drunk". When a person drinks an alcoholic beverage, the alcohol begins immediately to pass from the stomach to the blood stream. Two ounces of bourbon will be absorbed by the bloodstream in ten minutes, four ounces in thirty minutes, and eight ounces in one and one-half hours. The alcohol is carried by the bloodstream to all parts of the body with varying effects, but the brain is really affected the most. Alcohol numbs the brain in the area where our thinking takes place, then proceeds to the area that controls ordinary body movements. Coordination is affected, eyes fail to focus, and hands lose their dexterity.

Any pilot who flies within 8 hours after the consumption of alcoholic beverages or while under the influence of alcohol, is not only dangerous but is in violation of Federal Aviation Regulations.

DRUGS

Self-medication or taking medication in any form when you are flying can be extremely hazardous. Even simple home or over-the-counter remedies such as aspirin, laxatives, tranquilizers and appetite suppressors, may seriously impair the judgment and coordination needed while flying. The safest rule is to take no medicine while flying, except on the advice of your Aviation Medical Examiner. It should also be remembered that the condition for which the drug is required may of itself be hazardous to flying, even when the symptoms are suppressed by the drug.

Certain specific drugs which have been associated with aircraft accidents in the recent past are: *Antihistamines* (widely prescribed for hayfever and other allergies); *Tranquilizers* (prescribed for nervous conditions, hypertension, and other conditions); *Reducing Drugs* (amphetamines and other appetite suppressing drugs can produce sensations of well-being which have an adverse effect on judgement); *Barbiturates, nerve tonics or pills* (prescribed for digestive and other disorders, barbiturates produce a marked suppression of mental alertness).

Fact: After 8 drinks of alcoholic beverage, the average person will still have measurable blood alcohol levels 16 hours later.



Fact: Because of disorientation, non-instrument rated pilots will often lose control of their aircraft within 3 minutes after loss of visual contact with the ground or a true horizon.



Disorientation (Vertigo)

The flight attitude of an airplane is generally determined by reference to the natural horizon. When the natural horizon is obscured, attitude can sometimes be maintained by reference to the surface below. If neither horizon nor surface references exist, the airplane's attitude must be determined by artificial means - an attitude indicator or other flight instruments. Sight, supported by other senses such as the inner ear and muscle sense, is used to maintain spatial orientation. However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to spatial disorientation. The degree of disorientation may vary considerably with individual pilots, as do the conditions which induce the problem. Spatial disorientation to a pilot means simply the inability to tell "which way is up".

Surface references or the natural horizon may at times become obscured by smoke, fog, smog, haze, dust, ice particles, or other phenomena, although the visibility may be above Visual Flight Rule (VFR) minimums. This is especially true at airports located adjacent to large bodies of water or sparsely populated areas where few if any surface references are available. Lack of horizon or surface reference is common on over-water flights, at night, or in low visibility conditions. Other contributors to disorientation are reflections from outside lights, sunlight shining through clouds, and light beams from the airplane's anticollision rotating beacon.

The following are certain basic steps which should assist materially in preventing spatial disorientation:

1. Before flying with less than 3 miles visibility, obtain training and maintain proficiency in airplane control by reference to instruments.
2. When flying at night or in reduced visibility, use the flight instruments.
3. Maintain night currency if intending to fly at night. Include cross-country and local operations at different airports.
4. Study and become familiar with unique geographical conditions in areas in which the flight is intended.
5. Check weather forecasts before departure, enroute, and at destination. Be alert for weather deterioration.
6. Do not attempt visual flight when there is a possibility of getting trapped in deteriorating weather.
7. Rely on instrument indications unless the natural horizon or surface reference is clearly visible.

Motion Sickness

Although motion sickness is uncommon among experienced pilots, it does occur occasionally. A person who has been its victim knows how uncomfortable it is. Most important, it jeopardizes the pilot's flying efficiency - particularly in turbulent weather and in instrument conditions when peak skill is required. Student pilots are frequently surprised by an uneasiness usually described as motion sickness. This is probably a result of combining anxiety, unfamiliarity, and the vibration or joggling received from the airplane, and usually is overcome with experience.

Motion sickness is caused by continued stimulation of the tiny portion of the inner ear which controls the pilot's sense of balance. The symptoms are progressive. First, the desire for food is lost. Then saliva collects in the mouth and the person begins to perspire freely. Eventually, he or she becomes nauseated and disoriented. The head aches and there may be a tendency to vomit. If the air sickness becomes severe enough, the pilot may become completely incapacitated.

Pilots who are susceptible to airsickness should not take the preventative drugs which are available over the counter or by prescription.

These medications may make a person drowsy or depress his or her brain function in other ways. Careful research has shown that most motion sickness drugs cause a temporary deterioration of navigational skills or other tasks demanding keen judgement.

If suffering from airsickness while piloting an aircraft, open up the air vents, loosen the clothing, use supplemental oxygen, and keep the eyes on a point outside the airplane. Avoid unnecessary head movements. Then cancel the flight and land as soon as possible.

Fatigue

Fatigue generally slows reaction times and causes foolish errors due to inattention. In addition to the most common cause of fatigue, insufficient rest and loss of sleep, the pressures of business, financial worries and family problems, can be important contributing factors. If your fatigue is marked prior to a given flight, don't fly. To prevent fatigue effects during long flights, keep active with respect to making ground checks, radio-navigation position plotting, and remaining mentally active.

Panic

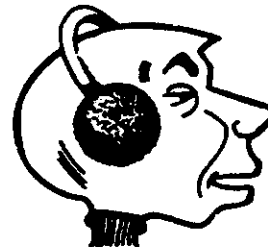
The development of panic in inexperienced pilots is a process which can get into a vicious circle with itself and lead to unwise and precipitous actions. If lost, or in some other predicament, forcibly take stock of yourself, and do not allow panic to mushroom. Panic can be controlled. Remember, *Prevent Panic to Think Straight*. Fear is a normal protective reaction, and occurs in normal individuals. Fear progression to panic, is an abnormal development.

Scuba Diving

You may use your plane to fly to a sea resort or lake for a day's scuba diving, and then fly home, all within a few hours time. This can be dangerous, particularly if you have been diving to depths for any length of time.

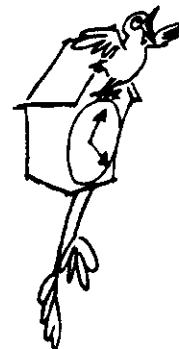
Under the increased pressure of the water, excess nitrogen is absorbed into your system. If sufficient time has not lapsed prior to take-off for your system to rid itself of this excess gas, you may experience the bends at altitudes under 10,000 feet where most light planes fly.

Fact: If you fly 6 to 8 hours weekly without ear plugs or other protection, you can experience some degree of permanent loss within a few years.



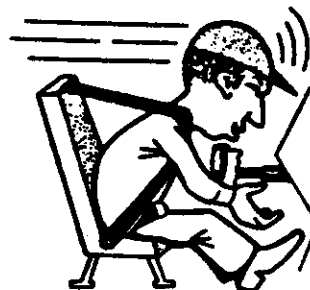
BEWARE

AND



BE AWARE

Fact: Approximately one-third of General Aviation fatalities could be prevented by the wearing of shoulder harnesses and seat belts.



Flying is a discipline...

safety is an attitude.