Attrition, the second primary consideration during preflight, relates to the general health of the aircraft. There are five aging elements that impact long-term health. They are: weather, friction, overload, heat, and vibration.

Weather constantly erodes the airplane. Changes in temperature and humidity have negative effects on both the exterior and interior of the aircraft as well as aircraft instruments. While rain, snow, ice, and especially hail can occasionally have a dramatic, short-term effect on an aircraft exterior, it is the subtle, long-term weather effects that generally take the greatest toll. Wind, sun, and dust constantly chisel away at aircraft paint and windows.

Friction, the wear between moving parts, is another insidious problem. Checking control surfaces to assure that they move freely and in the proper direction doesn't say much about how worn the hinges have become. Aileron, elevator, and rudder hinges should be scrutinized not only for freedom and proper direction of travel but also for excessive play. Hinges should also be visually inspected to assure that there is no damage or visible wear. And yes, I did say check for proper direction of travel. I once had a student preflight an airplane just out of maintenance, and he came to me and questioned the direction of travel of the ailerons versus the yoke. After I was done chiding him for not knowing, he told me that he was pretty sure that was right but the airplane wasn't responding that way. The cabling, which had been worn, was replaced and incorrectly rigged during maintenance.

There are also less obvious areas of friction that are nonetheless important. Check places where two things come together even if they are not intended to be a point of relative movement. I have seen cooling baffles that have rubbed their way through an engine cowling. It is far less expensive to resecure or replace an engine baffle without having to repair or replace the cowling at the same time.

Some overloads are fairly easy to detect, as they show up as cracks. If they are in a structural part of the aircraft, you must consult a mechanic. On the other hand, cracks in nonstructural parts such as fairing and wheel pants do not necessarily make an aircraft unairworthy. Look at the crack and determine if the relative wind in flight will cause it to open. Breaking off a piece of fairing or having a severe airflow disruption could not only be a real shock to the pilot, but also could result in aerodynamic problems. A neat, single layer of duct tape may be used to secure small cracks in nonstructural areas, but a good rule of thumb is to have it looked at by a mechanic before flight.

Other overloads are difficult, if not impossible, to detect after the fact. Severe overloading may result in deformation and structural failure. An overload can be induced in a number of ways. One sure way is to do a steep banked turn, sharp nose over, or other high-G-producing maneuver when the aircraft is loaded beyond allowable limits. The airframe may also experience overload conditions, even though significantly below maximum gross weight, while encountering turbulence if the airspeed is above maneuvering speed or during a close encounter with a thunderstorm.

Student pilots will tell you that "Any landing you walk away from is a good landing," but that's a matter of perspective based on who's paying the aircraft's maintenance bills. Probably the most common way of exceeding the maximum load limit of an aircraft is