leakage. The problem is that the sealant will, over time, deteriorate, resulting in fuel leakage. While having avgas leaking out of the wing and running down the fuselage or onto the ground is a major safety problem for several reasons, there is yet another problem associated with seal deterioration.

As fuel tank sealant ages, pieces break off and can become grit or a powderlike substance, which will clog a fuel filter. Simply put, aging sealant can result in engine failure. Whether that occurs during taxi, on a takeoff roll, or enroute over the mountains is simply a matter of chance. Therefore, the wet-wing fuel tanks of aircraft that are more than 10–15 years old should be inspected for possible sealant deterioration.

One way to eliminate the sealant deterioration problem of wet-wing tanks is to weld the seams rather than seal them. As you might anticipate, this is a costly process that results in a heavy, expensive tank. And it simply opens you up to a different set of problems such as vibration fatigue. Another option is fuel-resistant, synthetic rubber bladders, which are lighter than metal and very flexible. They are fitted easily into available space, relatively easy to replace, and much less susceptible to vibration fatigue. But even they have their problems.

Some types of rubber bladders become dry and brittle with age and begin to leak; however, filling the tank after each flight usually prevents this problem. Tanks made of Goodyear BTC-39 synthetic rubber (used in many Cessna, Beech, Rockwell International, and Piper aircraft during the 1960s and 1970s) developed a different problem—softness. An airworthiness directive (AD) required them to be inspected annually for deterioration; use of BTC-39 synthetic was finally discontinued by Goodyear, but if you own or regularly fly one of those aircraft, it is worth looking into.

Another problem that affects all rubber fuel bladders is wrinkles. When a synthetic rubber fuel bladder is installed, it is very difficult to get out all of the wrinkles. On the ground this acts as a water trap, but in-flight motion dislodges the water, causing a high potential for engine failure. This has become such a concern in the big Cessna singles (180, 182, 206, and 210) that the company issued an owner-advisory bulletin stating, among other things, that owners should "gently move and lower the tail to the ground" during preflight, which will hopefully cause any existing water to dislodge and show up in the preflight fuel sample. And remember, when you drain a fuel sump, a sample of a few ounces may not be enough to completely empty the fuel drain line and get to the water above it. Always take several samples from every sump.

That said, several experiments have shown that such a procedure may have little effect in removing entrapped water from these Cessna models. Consequently, AD 84-10-01 was issued requiring, among other measures, the installation of additional quick drains in these aircraft and an extensive check of the bladders for wrinkles and their effect on trapping water. If, after compliance with the AD, the bladder still traps more than three ounces of water, then an elaborate preflight inspection procedure is required, plus additional annual inspection considerations. It is simpler, and probably safer in the long run, to replace the fuel bladder with a new one.

Other parts of the fuel tank include vents and overflow drains. As the fuel level of a tank decreases, the fuel vent allows air to fill the space. It is important to preflight the vent. If a vent becomes blocked, fuel starvation will stop the engine and possibly collapse the tank. Overflow drains act as safety valves for fuel when it expands as a result of heat.