

## Chapter Fifteen

### PREFLIGHT

Preflight of the pneumatic system is limited to an under-the-cowling check of the general integrity of as much of the system as is visible. Hoses and fittings should appear in good condition with no kinks or twists. If the pump is visible during preflight, check the base where it attaches to the engine; traces of oil on the accessory drive pad indicate a bad seal. During the cockpit preflight, be especially watchful if the vacuum pump has passed the 500-hour mark, or 200 hours for the pressure pump.

The vacuum/pressure gauge should be an integral part of your instrument scan. Be aware of the normal gauge reading for cruise flight, as deviations may indicate impending failure. Any excessive gyro precession during ground operations is reason to suspect system problems. For instance, the attitude indicator should not show more than a 5-degree bank during taxi turns, assuming, of course, that you're not taxiing so fast that you actually do bank more than 5 degrees when you turn.

### PREVENTIVE MAINTENANCE

The single most effective preventive maintenance a pilot can perform on the pneumatic system is to forbid smoking in the aircraft. Tobacco smoke is a prime cause of clogged filters and shortened gyro life. One of the worst and most disgusting tasks on a 100-hour inspection is to clean the filter of an aircraft that is regularly flown by smokers. It is literally coated with a thick, mucouslike layer of nicotine. Collect some and put it in a jar, and the next time someone wants to light up in your airplane, scoop out a big glob, hold it under his or her nose, and shout, "That's what's in your lungs!" It's a good idea to have a sic-sac ready in advance.

Where gyros are concerned, small problems rapidly turn into big ones. Some mechanics, for instance, check filters at the required time and if they don't look dirty, they won't clean them. The problem is that dirt gets trapped inside the filter where it's not visible, then it works its way out and into the gyros.

Literally any small particle can cause a gyro to fail! In one general-aviation airworthiness alert, the gyros stopped working when the vacuum system had excessive suction. The master air filter appeared clean, but after it was torn open, it was discovered that water had leaked inside. The filter had absorbed the water, swelled, and blocked the airflow. From the outside, the filter looked fine.

In general, filters should not be cleaned; they should be replaced. The problem is more subtle than just potential contamination. The longer a filter screens, the lower the volume of air that can pass through it. If the filter is located upstream from the pump, the decreased airflow forces the pump to work harder. This increase in workload causes the pump to run hotter, which increases the wear on it and shortens its life.

Under normal conditions, the vacuum regulator filter or pressure system inlet filter should be changed every 100 hours of operation or every year, whichever comes first. Central air filters and in-line filters should be replaced every 500 hours or annually, whichever comes first. If an aircraft is operated in a high-humidity area, mechanics often recommend changing in-line filters every 300 hours.