

Chapter Seven

There is little troubleshooting that can take place in flight. The system either works or it doesn't. If there is a sudden loss of m.p., the turbocharger is the likely culprit, and you will have just reverted to a normally aspirated engine. That alone is not a significant problem, unless you are over high mountains. The most important question is, why did the turbocharger fail? Watch for fire!

In the event of a turbocharger failure, carefully monitor pressures and temperatures and watch for a loss of engine oil. Any sign of either fire or loss of oil merits an immediate engine shutdown. One other preventive measure you can take is to listen to the system. Become familiar with the sound of your turbocharger; it has a high whistle or whine that can be very eerie sounding when flying at night in the clouds; come to think of it, everything is eerie sounding when flying at night in the clouds. Anyway, should that sound become abnormally loud or shrill, there probably is insufficient bearing clearance and the unit needs servicing to head off a failure.

The best preventive maintenance is to catch problems before they become major. At 100,000 RPM, little problems become big problems fast. Oil leaks, unusual vibrations, and sounds should be followed up carefully. Nothing is as effective as good operating procedure. When shutting down the engine, the oil pressure drops to zero, and so does the lubricating ability of the turbocharger. A typical approach and landing is at low m.p., allowing plenty of time for the unit to spool down. But, if high m.p. is carried on the approach, or used during taxi, the turbine still will be spinning after engine shutdown, but there will be no lubrication for it. The prudent pilot will set the engine at idle for several minutes prior to shutdown to assure adequate lubrication and spool-down time.

It is also important to change oil at least at the frequency prescribed in the pilot's operating handbook (POH). The bearings are highly susceptible to dirty or improper oil. Turbochargers should be overhauled at the same time the engine is, at the recommended time between overhaul (TBO). In the long run, this reduces unscheduled downtime and gives the owner a lower operating cost.

Spinning turbocharger parts are machined to within one-millionth of an inch. It is a good idea to conduct any required maintenance or inspections on time. Assure that there is no buildup of exhaust carbon or warpage in the wastegate. Pilots who operate in dusty or smoky air should be especially careful to change the oil frequently and follow prescribed inspections. If it sounds as if turbochargers are problematic, then you should realize that at least one manufacturer has no scheduled periodic maintenance requirement for its turbochargers. If you follow normal engine maintenance and keep the oil clean, there should be no problems at all!

Finally, most modern turbocharged engines have overboost protection. Don't rely on it! Always allow a minimum of 30 seconds warm-up before running up an engine, longer when it's cold; this prevents oil lag. On takeoff, advance the throttle gently to about 25 inches while holding the brakes. Let the turbocharger come up to speed, then release the brakes and gently advance the throttle to the m.p. indicated in the POH for takeoff.