best decision for you, it is necessary to understand the terms related to engine overhauling and rebuilding.

A very commonly misunderstood term is TBO. Most pilots, being used to the concrete meaning of annual inspection and 100-hour inspection, expect to get the manufacturer's recommended TBO out of their engine. They don't understand that the emphasis is on recommended. Handling and care determine the actual time between overhauls. The pilot who practices proper engine care will almost certainly be rewarded with an actual time between overhaul in excess of the manufacturer's recommended. And yes, you can exceed TBO as long as the engine continues to operate properly and passes routine inspection! On the other hand, the negligent pilot is likely to run out the engine long before reaching TBO.

According to FAR 43.2(1), an overhauled engine is described as follows.

> "Using methods, techniques, and practices acceptable to the Administrator, it (the engine) has been disassembled, cleaned, inspected, repaired as necessary, and reassembled; and (2) It has been tested in accordance with approved standards and technical data...acceptable to the Administrator."

This very vague wording requires that an overhauled engine be restored to manufacturer's approved "service limits." While there are FAA guidelines dictating service limits, it is acceptable to replace an out-of-tolerance part with a used one that is within tolerance. However, the used part may be on the borderline of the tolerance and will exceed it after only a few hours of use! From a practical standpoint, few, if any, overhaul shops are going to employ parts that are close to tolerances because they would most likely be required to replace them at their own expense during engine warranty. After the overhaul is complete, the engine logbook's total time continues, and it is noted that the engine has zero hours since major overhaul (SMOH).

While the manufacturers would prefer to sell everyone a new, or rebuilt, engine, that does not meet the needs of all customers. Therefore, most manufacturers also overhaul engines, but unlike the typical nonmanufacturer overhaul facility, they will replace all critical parts with new OEM (original equipment manufacturer) parts as a matter of routine. In addition, the OEM will use the latest modifications in accordance with manufacturer's modification changes. Some mechanics also believe that the OEM will do a better job on their own engines than an outside shop would. Lycoming, for instance, will not weld cracks in the crankcase or cylinder; instead they prefer to replace them.

What's the big deal about welding cracks in a crankcase or cylinder? According to Avco Lycoming's Williamsport Division Metallurgical Laboratory, welding aluminum can lead to significant problems. First of all, it is important to know exactly which aluminum alloy is being used, but that is proprietary information. A welder may or may not know for sure, and using an improper welding technique leads to premature failure. Yet another reason is that welding aluminum is not easy; few welders can successfully handle the job, and even the best can leave traces of tungsten, making it an unsatisfactory weld.

Complicating the problem still further, every new crankcase is heat treated for strength, then machined for exact tolerances. Normal welding technique may cause distortion of the