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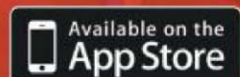
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MAINTENANCE

Tips for the Aging GA Fleet

With proper maintenance and upgrades most will continue to operate in a safe airworthy condition well into the future



By Ronald Donner

Ronald Donner has spent his entire life devoted to aviation and he holds FAA certificates as an A&P/IA, and a Commercial Pilot with Single and Multi Engine Land, Instrument Airplane and Glider ratings.

Visit any general aviation airport and you'll undoubtedly find a variety of aircraft and a variety of aircraft ages. According to a General Aviation Manufacturers Association 2010 report, there are approximately 114,000 active personal use single engine piston aircraft, and 16,000 two engine piston aircraft in the United States. When you add the number used for business purposes the total is 155,000. The average age of the GA fleet in the United States is estimated to be 40 years old.

Vintage and antique aircraft have undergone restorations and many are in better condition today than when new. But what about the 30- to 50-year-old Piper, Cessna, Beechcraft, or Navion, built using aluminum and other materials of that era? With proper maintenance and upgrades, most will continue to operate in a safe, airworthy condition well into the future.

To learn more about maintaining the aging GA fleet, I visited Chris Gardner and his crew at Sierra Hotel Aero Inc. located at Fleming Field in South St. Paul, MN. Sierra Hotel Aero has become known as the Navion maintenance

Anyone working on older GA aircraft have experienced the aftermath of rodents when aircraft sit idle.

and restoration specialist offering routine and major maintenance and upgrades to keep this aging aircraft safely flying. I first ask Gardner why the Navion and he shares, "Years ago I worked for a company in California rebuilding the North American Aviation P51 Mustang. The Navion, also originally built by North American, shared similarities and I guess I just gravitated toward it."

In 1998 Gardner received Supplemental Type Certificate (STC) approval for an external baggage door, and in 2001 soon after moving to Fleming Field he received Parts Manufacturing Approval (PMA) for the door. At the end of 2002 he purchased the Navion Type Certificate (TC) along with all the drawings and production tooling. Currently he has PMA on most major assemblies for the Navion. To say that Sierra Hotel Aero only maintains these aircraft is an understatement. One Navion in the shop, shored in special made cradles, had the entire fuselage and wing lower skins replaced.

Gardner believes that during the 1960s and 1970s owners and maintainers of these types of aircraft didn't expect they would be flying another 40 or 50 years; after all they were already 20 years old. Perhaps this created a thought that many aircraft of this period were eventually destined for scrap and major maintenance and upgrades weren't needed. He explains the original documentation and history for the Navion indicates it was intended to last approximately five years.

Replacement and substitute parts

Gardner shares that corrosion is common and regularly corrected but says the biggest challenges are the mechanical and electrical components and systems. Many are just worn out, have not been properly maintained,



Photo provided by Sierra Hotel Aero Inc.





Photo provided by Sierra Hotel Aero, Inc.

Lyle Kiecker with one of the many Navion aircraft maintained at Sierra Hotel Aero.

or have been neglected over the decades due to several reasons including lack of direct replacement parts.

Original components such as wheels, brakes, valves, and hydraulic actuators are simply worn out and no longer serviceable. The supply of new/old stock has dwindled and reliance on STCs and PMA parts is a must. When preparing for modifications and replacement parts and materials, he stresses the importance with providing traceability for data and materials; basically everything you do relating to substitution and replacement parts and materials. He says, "Clearly describe the process you intend to use and include material data, prior approvals, and Instructions for Continued Airworthiness." Using data from previous approvals for a basis of a new approval is important.

Using fuel systems as an example Gardner describes how selector valves eventually wear out and hoses and lines deteriorate. New replacement valves have been developed and approved but this is only one part of the system. He also explains, that in the Navion, the fuel system cross feed tubes from the two main-fuel tanks to the header tank are rubber hose, and not easily accessible, and many times items like these are overlooked because of the appearance using a flashlight and inspection mirror they are OK.

Electrical systems are another area that needs special attention. Over the years electrical instruments, avionics, and components are replaced or added, and associated switches, circuit breakers, and wiring have either been replaced, repaired, spliced, or at times left original and can become a real mess.

Gardner says, "We've found

flight control cables with a heavy coating of oil or a coating intended to protect cables when often times this only hides cable corrosion."

Best practices and guidance

When asked what best practices he could offer Gardner shares, "Inspect and document everything. Determine which items are airworthiness and safety of flight items, and which items can be considered *nice to fix*. Inspect all old repairs, look at their prior approval basis, and ask and answer the simple question, are they good quality approved repairs? If so leave them. And most important review the entire aircraft and your findings with the owner so there are no surprises later."

Earl Lawrence, manager of the FAA's Small Airplane Directorate Aircraft Certification, shares some of his views. He says, "New tech-