PREMIUM ON SAFETY

ISSUE 03 YEAR 10

INSURING SAFE SKIES

IN THIS ISSUE

A MESSAGE FROM USAIG

Greetings!

USAIG continually seeks ways to further improve the safety records of all segments in the aviation community. This newsletter is one example of that commitment.

From gear-related mishaps to flying with new technologies, *Premium On Safety* allows us to share safety information and help keep you out of harm's way—we hope.

No matter what your experience level, safety and wellbeing can quickly be jeopardized by a lapse in judgment ("Hazmat hazards," p. 6).

David L. McKay
President and COO, USAIG

From steam to glass…and back

Transitioning to new cockpit technology

BY ROB FINFROCK

The proliferation of glass panel cockpits in the past five years is nothing short of astounding. Today, aircraft as diverse as the humblest light sport airplane to the fastest business-class turboprops and light jets offer technology we may not have imagined just a generation ago. With this onslaught of new technology has come the need for more advanced training for new pilots and, particularly, those transitioning from old-style gauges or early electronic flight information systems (EFIS).

Albuquerque, New Mexico-based AeroLynx added a 2008 Cessna 208B Super Cargomaster to its fleet of older Cessna piston twins in early 2009. During the past year, the workhorse turboprop—the freight variant of the popular Grand Caravan—has carried a vast amount of bank work, biological specimens, and general commodities cargo throughout the southwestern United States, on behalf of the Part 135 operator's sister company, Distribution Management Corp., Inc.

The aircraft was also among the first C208s to be delivered with a Garmin G1000 avionics suite, a feature that required AeroLynx to transition its own training practices from the era of steam gauges to the world of glass.

"The people we've trained on the G1000, we take them completely out of our system for four to five days in order to introduce them to the new technology, before any ground training or flight time," says chief pilot Yamil Quinones. "It starts out with the very beginning: What are primary and multifunction flight displays [PFDs and MFDs], what kind of sensors are behind the panel? To have someone completely know how to operate the system—where the AHRS [attitude and heading reference systems] are located—it takes a reasonable amount of time to learn all that."

That ground time also helps pilots become familiar with some "quirks" inherent to glass cockpits: "Something as basic as parking next to a metal hangar, shutting the airplane down, and having the magnetometer on the left side pointing to a crazy direction and the one further away pointing in the correct direction," Quinones says. "When you start up again, you're going to have a conflict with the right magnetometer feeding PFD number 2, and the left magnetometer feeding PFD number 1. You need to know what that warning means and how to troubleshoot it."

For pilots transitioning from hundreds of hours flying behind a "classic six" panel, the greatest hurdle to learning the G1000 involves becoming comfortable with glass. "To switch from steam gauges to G1000 is easier than going from G1000 to steam gauges, that's for sure," says company instructor Sean Roukema. "It certainly requires three, four, five hours on the ground with the panel on,

(continued on page 2)

DID YOU KNOW?

PREVENTIVE MAINTENANCE: TAKE THE ASF QUIZ CHALLENGE

Are you an expert on preventive maintenance rules? See if you can answer these few questions; then take the complete quiz and receive your score at **www.asf.org/mxquiz**.

1. While talking with a friend, you tell him that your A&P showed you how to change the oil in your aircraft and let you do most of the work while he supervised. Your friend says that his aircraft is due for an oil change, but that he doesn't want to pay an A&P to do the work. Are you allowed to do the oil change for him as a favor?
a. Yes, an oil change qualifies as preventive maintenance
b. Yes, as long as you aren't receiving payment for your services
c. No, you may only perform preventive maintenance on an aircraft you own or operate
d. No, only an authorized mechanic can perform an oil change

2. During preflight you notice a small ding in the leading edge of the propeller of your aircraft. Are you allowed to file out the ding?
a. Yes, propeller repairs such as filing and straightening are preventive in nature
b. No, propeller repairs are not considered preventive maintenance
c. Yes; because you cannot fly the aircraft safely, it is your responsibility to fix the ding
d. No, you cannot file a dinged propeller; it must be replaced

3. You may replace side windows on your aircraft.
a. True
b. False

The answers can be found on page 8.

AOPA Air Safety Foundation Online quizzes are underwritten by the AOPA Insurance Agency, Inc. The quizzes use graphics and interactivity, while standard multiple-choice and true/false questions are augmented by drag-and-drop matching exercises and fill-in-the-blank brainteasers. A new quiz is featured every two weeks.

From steam to glass *(continued from page 1)*

plugged in to a ground power unit, pushing buttons. A computer-based G1000 simulator is also an asset.

"When it comes to the air portion of it, it doesn't take a whole lot of time to get someone into the G1000," Roukema adds. "If they already have time in [the Caravan] and are current in the aircraft, it probably will only take another three or four hours of actual flight time to switch over."

Previous experience on Garmin products also helps. "A Garmin is a Garmin, and that's a good thing about them," Roukema says. If a pilot is familiar with operating a Garmin 430 or a 530, "They'll be much further ahead than if they're coming from steam gauges and King radios."

In addition to training its pilots to operate the G1000, AeroLynx has also encountered the situation in reverse—with pilots coming "down" from flying glass cockpits with moving maps, and transitioning them to the older-style gauges in its fleet of Cessna 310s and 402s.

"Take a pilot whose time comes from flying airlines, or right seat in a King Air, and he knows how to fly that thing," says Thomas Heinemeyer, director of operations at AeroLynx. "Then he gets laid off, say the King Air gets sold. And he thinks, 'Well, I'm a hotshot, I have 3,000 hours—but it's all flying glass.' Now they're going to be flying older airplanes, because that's the only job that's available.

"It's not so much they can't intercept the localizer, or shoot an ILS," he continues. "It's not knowing in your head where you are at all times, in relation to your speed. That's what can hurt them. It's a steep learning curve."

"Something as basic as parking next to a metal hangar, shutting the airplane down, and having the magnetometer on the left side pointing to a crazy direction…"

Heinemeyer also has a firm opinion on how to address the issue for pilots attempting to transition from glass to gauges. "If you get your instrument rating in a glass cockpit, you should need to get a separate one in a six-pack," he states.

Above all for AeroLynx, and similar on-demand operators, is the need for a pilot to be familiar with the system. "We operate on a daily basis, and we cannot fail in doing that because a pilot is not ready or doesn't feel comfortable," says Quinones. "We must make sure the pilot out there is ready."

Rob Finfrock is a licensed sport pilot, and formerly managing editor of an online aviation news service.

AeroLynx Cessna 208B Super Cargomaster. Photo by Patrick Allis

Safety Brief: NTSB study

Glass cockpits not safer...yet

On March 9, the National Transportation Safety Board offered a glimpse at the results of its exhaustive, yearlong look at the safety of technologically advanced aircraft. A review of more than 8,000 aircraft involving piston engine, general aviation aircraft showed the fatal accident rate for airplanes equipped with glass panel avionics systems was greater than that involving similar aircraft equipped with conventional instruments.

"While the technological innovations and flight management tools that glass cockpit equipped airplanes bring to the general aviation community should reduce the number of fatal accidents, we have not—unfortunately—seen that happen," said NTSB Chairman Deborah Hersman.

While the full report has been published, the NTSB wasted no time issuing six recommendations to improve safety trends for glass cockpit aircraft. Among those is a call for improved pilot education, with an introduction to glass panel systems operations earlier in the pilot training curriculum; recurrent flight proficiency requirements, to ensure pilots remain skilled at operating glass panels; and increased training for pilots to quickly identify and remedy system malfunctions or defects.

"Training is clearly one of the key components to reducing the accident rate of light planes equipped with glass cockpits," Hersman continued. "We know that while many pilots have thousands of hours of experience with conventional flight instruments, that alone is just not enough to prepare them to safely operate airplanes equipped with these glass cockpit features."

The board's recommendations came as little surprise to the pilots interviewed for "From steam to glass...and back" (Page 1). The topic of differences with glass panels—and potential disadvantages for pilots used to flying with conventional avionics—came up frequently during the interviews.

AeroLynx instructor Sean Roukema noted a particular difference flying with the G1000 that still requires adjustment, despite his years of experience with the popular Garmin system. "When hand-flying, in some cases it takes longer to interpret the data on the G1000 than it does with a six-pack of gauges," he said. "With a glass panel, I'm not seeing trend differences out of the corner of my eye, if the VSI is going up or down."

Chief pilot Yamil Quinones feared glass panels may present "information overload" to pilots during a critical situation. He also expressed concern the added features of a glass panel, from moving maps to XM satellite radio, may divert a pilot's attention from the task of flying the airplane under even normal circumstances. "I thought one of the things you're trained on from the beginning was, don't get distracted!" he said.

Another NTSB recommendation calls for better reporting of glass panel defects by operators, through the Service Difficulty Reporting System (SDRS). One such malfunction arose several months ago with AeroLynx's G1000-equipped Cessna 208B.

"There was a software glitch switching NAV 1 to NAV 2 at a certain point," Quinones explained. "When setting an ILS approach, at the intersection heading, suddenly when you got to that heading and switched from Nav mode to approach mode, it actually chose the previously set VOR and started flying outbound. Suddenly you're flying a different course, and you're going the wrong direction."

Thanks in part to SDRs from operators, a fix has since been issued by Garmin.

—RF

The AOPA Air Safety Foundation conducted a safety and training study on technologically advanced aircraft during 2007. This NTSB study confirmed ASF findings, including the notion that pilot training and proficiency with the avionics suite are crucial to deriving safety benefits from glass cockpits. To download *Technologically Advanced Aircraft* visit **www.asf.org/taa**.

—MAS

Real Pilot Stories

Lessons from the cockpit

The ATC perspective

ASF's Real Pilot Stories **(www.asf.org/rps)** provide a realistic reenactment of a good flight gone bad, using interactive visual and audio—even actual ATC audio footage—to share lessons learned.

For a twist on the usual presentation, enter the story of Doug White, then a low-time Cessna 172 pilot and passenger aboard King Air N559DW when his pilot became incapacitated while climbing through 11,000 feet. Get behind the scopes at Miami Center and Fort Myers Approach with recently added behind-the-scenes interviews with the air traffic controllers who helped save White and his family. The controllers received the coveted Archie League Medal Of Safety Award for their outstanding efforts handling this emergency **(www.asf.org/kingairrps)**.

Accident Profile: Asleep at the yoke

BY DAVID JACK KENNY

Accidents attributed to fatigue are relatively rare—maybe in part because there's often too little left to reach a positive conclusion. Fatigue may play a role in many of the accidents described as "crashed for unknown causes." Who would know?

Sometimes, though, circumstances make the role of fatigue pretty plain. One example was the crash of a King Air B90 seven nautical miles west of Dodge City, Kansas, in February 2004. The air ambulance was returning to base on a Part 91 positioning flight after having flown three patient transports and two positioning legs over the previous 12 hours. It left Wichita on an IFR flight plan at about 2:15 a.m. Visibility was seven miles under clear skies, and the pilot cancelled IFR 34 nm from Dodge City after being cleared for a visual approach. He answered, "You, too," to the controller's, "Have a good morning," switched to a transponder code of 1200, and began descending from 10,000 feet msl at 850 to 950 fpm.

Radar data showed that over the next 12 minutes, the airplane maintained a steady rate of descent and a ground track of 270 degrees, passing about eight-tenths of a nautical mile north of the airport. Airspeed increased from 180 knots in cruise to a maximum of 214. The last radar contact came 4.7 nm west of the field at 3,200 feet msl. The accident site was seven nautical miles past the airport; the airplane flew into the ground with the gear up and wings level. Both physical evidence and witness reports suggested that the engines were making ample power. The wreckage path was a quarter-mile long; the pilot, paramedic, and flight nurse were all killed. It was three minutes before 3 a.m.

The pilot's day had begun at six the previous morning. He'd traveled more than five hours to reach his duty station, deadheading on a freight carrier from Dallas to Wichita and then driving two hours to Dodge City. He'd flown five legs between 2:30 p.m. and 1 a.m. Other pilots in the company lounge in Wichita described him as active and alert before his last takeoff. By then, he'd been on duty for 14 hours and awake for more than 20.

By then, he'd been on duty for 14 hours and awake for more than 20.

The NTSB was careful to note that the pilot never exceeded the flight-time limitations of FAR 135.267, which didn't apply anyway since the accident flight was made under Part 91. Chances are he never knew how tired he really was—and either his crew couldn't see him, or they also fell asleep. Maintaining IFR until landing and staying on frequency with ATC would have been a shrewd precaution.

David Jack Kenny is manager of aviation safety analysis for the AOPA Air Safety Foundation, an instrument-rated commercial pilot, and owner of a Piper Arrow.

IN THE NEXT ISSUE

NESTING SEASON

Prevention and Detection

Data Diving:
Retractable gear accidents in review
From the ASF Accident Database

Between 1999 and 2008, pilot errors in operating retractable landing gear caused 234 accidents, an average of almost two a month. Most occurred during non-commercial flights, but 19 took place in Part 135 operations. All told, nine aircraft were destroyed and the rest suffered substantial damage. The vast majority (89 percent) caused no injuries, but 14 people were killed and 14 more were seriously hurt.

The aircraft included 139 piston singles, 77 piston twins, four single-engine turboprops, 11 turboprop twins, and three jets. No specific makes and models really dominated, although 11 of the 19 commercial accidents were in piston twins, six in Piper Navajos. Beech Debonair and Bonanza models accounted for 21 accidents, the same number as Cessna 210s, and 16 took place in Piper Comanches. Beech Baron, Travel Air, and Queen Air models were involved in 26 accidents, Piper Navajos in 16 (including six commercial), and Cessna twins in 14. Smaller Piper twins (Senecas, Seminoles, Twin Comanches, and Aerostars) accounted for 17, while only seven involved the popular Piper Arrow, Lance, and Saratoga models.

In more than half (130), the pilot simply forgot to extend the gear; in another dozen, the pilot failed to confirm that they were down and locked, and in four the gear were extended too late to lock before landing. In 30 cases, the gear were accidentally retracted during the landing roll, and there were 30 wheels-down water landings in amphibians, which caused eight of the 14 fatalities. Twenty-one arose from improperly executed emergency gear extensions, and seven gear collapses were caused by excessive side loading (**www.asf.org/database).**

Accidents Involving Retractable Gear Operation, 1999 – 2008
234 total, 8 fatal: 14 killed and 14 seriously injured

Part 91 and public use:	**Part 135:**
215 accidents, 6 fatal	19 accidents, 2 fatal
7 people killed and 8 seriously injured	7 people killed and 6 seriously injured
8 aircraft destroyed	1 aircraft destroyed
207 aircraft substantially damaged	18 aircraft substantially damaged

Aircraft:	
139 piston singles	
Most common models:	
Beech Debonair/Bonanza	21
Cessna 210	21
Piper Comanches	16
4 turboprop singles	
77 piston twins	
Most common models:	
Beech Baron/Travel Air/Queen Air	26
Piper Seminoles/Senecas/Twin Comanches/Aerostars	17
Piper Navajos	16
Cessna piston twins	14
11 turboprop twins	
3 jet twins	

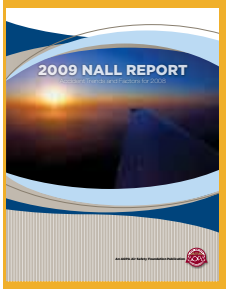
Causes:	
Forgot to lower gear	130
Wheels-down water landing in amphibian	30
Accidentally retracted gear during landing roll	30
Improper emergency extension	21
Failed to confirm gear down and locked	12
Gear collapsed from excessive side loading	7
Lowered gear too late to lock	4

ASF ONLINE

The Nall Report

Examining accident trends

The *2009 Joseph T. Nall Report* marks the twentieth edition of the country's most comprehensive analysis of general aviation accidents. In honor of this milestone, the AOPA Air Safety Foundation has broadened the scope of its traditional focus to cover two important areas not treated by earlier reports—helicopters and on-demand flights made for hire under FAR Part 135. Together with non-commercial fixed-wing accidents, these activities made up more than 99 percent of all general aviation flight activity in 2008.



On the fixed-wing side, the accident rate of non-commercial flights declined slightly, while the commercial flights accident rate hit its highest level in five years—which was still one-third lower than the accident rate under FAR Part 91. Helicopter accident rates have decreased sharply since 2003 and were similar to fixed-wing rates in 2008; commercial helicopter flights actually had the lowest rate of fatal accidents in all of general aviation.

The report is based on NTSB accident reports involving powered fixed-wing general aviation aircraft weighing 12,500 pounds or less and rotorcraft of all sizes. It also incorporates unusual accident factors, involving collisions, alcohol and drugs, physical incapacitation, off-airport ground injuries, and propeller and rotor strike injuries.

Not surprisingly, pilots continued to be their own worst enemies; even on commercial flights, more than 60 percent of all accidents and a full 80 percent of fatal accidents were deemed to be pilot-related.

Go to **www.asf.org/nall** to download the current report and review previous editions. If you are interested in finding out more about a specific accident, you can search the ASF accident database online **(www.asf.org/database).**

DID YOU KNOW?

TURBINE AIRCRAFT MAINTENANCE PROGRAMS

According to the Aircraft Owners and Pilots Association, aircraft owners have more say—and more responsibility—in the maintenance of their aircraft according to an FAA interpretation of FAR Part 91.409, which requires multiengine turbine jets, multiengine turboprops, and turbine helicopters be enrolled in a current maintenance program recommended by the aircraft manufacturer.

The interpretation clarifies that *current* refers to the version of the maintenance program existing at the time the program is adopted. (Previously, it had been interpreted to mean that owners had to comply with the most up-to-date version.) This is particularly good news for Cessna 425 and 441 Conquest owners, who now need to comply with the maintenance program in place at the time they adopted the program, not the most current version of Cessna's maintenance program, which has extremely invasive inspections, including the removal of the aircraft's wings, because of multiple updates to Cessna's maintenance program.

Aircraft owners can still opt to have their aircraft go through the most recent maintenance program. Considering much has been learned in the past 20 to 30 years that led to program updates, owners should consult their maintenance providers to determine which parts of the inspections they want performed.

"Owners should consider many factors, including the aircraft's history, total time, how long they've owned it, how familiar they are with its maintenance, and the information they gather from those who have completed the inspections in making their decisions," said Rob Hackman, AOPA senior director of regulatory affairs.

Pilot Peril: Hazmat hazards

BY MACHTELD A. SMITH

N111AX, a Beechcraft 1900, departed Sheldon Point, Alaska, on a Part 135 nonscheduled cargo flight transporting several large metal cylinders designed to hold compressed gas. Some cylinders were empty, while others contained carbon dioxide.

The flight made a fuel stop in Aniak, Alaska, where the crew filed an instrument flight plan to Anchorage. When N111AX's crew failed to report being airborne, the ramp agent received a telephone call from Anchorage ATCC inquiring about the flight. The agent noticed the Beechcraft sitting on the ramp with its

engines stopped and the airplane lights dimly lit. When the agent opened the airplane's door he found the first officer unconscious inside the door and the captain unconscious at the controls. He pulled both crewmembers out of the airplane, onto the ramp, and ran for help.

The flight crew regained consciousness while lying on the ramp and walked to the freight building, where they received medical care. They could not remember what had happened during the time after the engines were shut down and before they awoke outside.

The crew recollected aborting the takeoff when they had heard a hissing sound from the cargo area. During taxi back to the ramp, the first officer had felt the effects of the gas releasing, and both crewmembers had opened the cockpit windows, but the crew lost consciousness before they could exit the airplane.

On December 18, 2007, the day after the incident, an FAA inspector examined the airplane. The cargo compartment had two tank racks containing five bottles each, standing vertically along each side of the airplane. Two cylinders in the left rack and three cylinders in the right rack did not have safety caps installed. The caps were found on the airplane's floor. (The cylinders are designed with a screw type valve, and a threaded metal safety cap, which is used to protect the valve.) The middle tank of the three cylinders in the right rack had a partially open valve, which was positioned against the interior side-wall of the cargo compartment. The interior of the airplane had a large amount of frost.

The crew oxygen masks had not been used, and the crew oxygen supply tank was full.

The inspector also found nine carbon dioxide tanks lying on the cargo area's floor. They were braced by chocks, but not strapped down. The crew oxygen masks had not been used, and the crew oxygen supply tank was full.

The FAA Hazardous Materials Division considers cylinders of carbon dioxide hazardous material because they are a pressurized gas in excess of 40 psi. With hazmat transport the shipper is responsible for identifying and declaring hazardous materials, the carrier is responsible for training airplane crewmembers to identify and accept hazardous materials, and the flight crew is responsible for properly securing hazardous materials during transport.

The NTSB determined the probable cause of this incident to be a hazardous leak from carbon dioxide cylinders due to the flight crew's failure to properly load and secure the cylinders, resulting in crew incapacitation. Contributing were improper hazardous materials procedures used by the shipper and a failure of the operator to train the crew in hazmat procedures.

Luckily no one was seriously injured.

Machteld Smith is a senior aviation technical writer for the AOPA Air Safety Foundation and a multiengine instrument-rated commercial pilot.

Safety Experts: The high cost of gear-up landings

BY ROB FINFROCK

"There are those who have and those who will" is a familiar axiom in aviation circles, about the indignity of a gear-up landing. Though seldom fatal, such accidents are often very damaging to airframes, engines, and delicate pilot egos.

CFI Thomas Turner is president of Wichita, Kansas-based Mastery Flight Training. His personal mission is to reduce the number of landing gear-related mishaps, or LGRMs. "I've tried for over 10 years to determine, through mishap study, data correlation, and pilot observation, how pilots can forget something as elementary as putting the wheels down before landing," he says.

It's an expensive problem. Turner cites data from the aviation insurance industry pegging the average repair cost of a "minor" LGRM in a single-engine piston aircraft at $60,000, thanks largely to engine and propeller damage. For turbines, the cost may eclipse $100,000 or more.

Two-pilot crews common to many turbine airplanes are more likely to catch an error or omission than a pilot flying alone.

LGRMs happen more frequently than pilots may realize. While overall rates have fallen in recent years, Turner points out the decline "seems to reflect the reduction in flying activity that is mirrored in the reduction in aircraft fuel sales." According to Turner the percentage of LGRMs out of all mishaps involving retractable-gear piston-powered aircraft has hovered near 50 percent for the past decade. The overall rate of LGRMs involving turbines is lower, but has also remained relatively constant for the segment.

"In other words," Turner notes wryly, "we don't seem to be getting any better at avoiding LGRMs, except by not flying at all."

Although turbine-powered aircraft make up a smaller percentage of the aviation fleet than pistons, utilization rates are often much higher. This makes the lower percentage of LGRMs in turbine-powered aircraft particularly noteworthy. Turner attributes the difference to stricter training procedures for turbine pilots, and the virtue of redundancy.

"Two-pilot crews common to many turbine airplanes are more likely to catch an error or omission than a pilot flying alone," he explains. "The distraction may be another airplane, weather hazards, passengers or a flight instructor on board, or a minor airplane anomaly. When landing gear fails mechanically, on the other hand, it's almost always because of incomplete or improper maintenance, or failure to follow manufacturer recommendations for preventive maintenance and overhaul."

So, what may be done to reduce LGRMs, short of welding the gear in place? Noting "avoiding risk is most effectively accomplished by eliminating the risk factor," Turner suggests automation may be the most effective solution for reducing LGRMs. While such systems have been tried before, modern GPS technology may be the key to developing a practical backup system able to lower the gear based on aircraft position, groundspeed, and altitude.

"Far less effective in mitigating risk are alarms and warning systems," Turner says. Regarding mechanical failures, "manufacturers can continue to publish landing gear service and inspection recommendations, and more aggressively distribute Service Difficulty Reports and other reports of landing gear maintenance issues to the fleet. There are many areas where inspection and preventive maintenance may be deferred; the landing gear is not one of them.

"Gear up or gear collapse, pilots, instructors, mechanics, and inspectors need to remember LGRMs can happen to anyone, any day," Turner concludes, "and to follow strict procedures to make sure it does not happen today." (See, "Data Diving: Retractable gear accidents in review," p.5.)

My radio and my TCAS, they comfort me—Not.

Traffic patterns at nontowered airports account for the highest potential for mid-air collisions. Regardless of the size of the hardware you're operating, or the collision avoidance equipment on board, you're vulnerable because there are aircraft that are below radar coverage, which is required for some systems. If ATC can't see it then the anti-collision gear can't see it. Some systems can see transponders directly but there are some aircraft without electrical systems, such as antiques and sailplanes; therefore, no radio and no transponder.

Proper pattern entry procedures are essential, as is use of the radio. "Any traffic in the area, please advise" is NOT acceptable because other traffic may not be on the frequency or even have a radio—see previous paragraph. If you're on an IFR flight plan but operating in VMC, guess which rules prevail in the pattern? VFR! Descending through a cloud deck, on approach, into a nontowered pattern where ceiling and visibility remain above VFR minimums, we have to be prepared to fit in with the flow.

Straight in finals aren't prohibited but the eyes have it—look and practice sterile cockpit procedure.

Safe Flights.....

Bruce Landsberg

Bruce Landsberg
President,
AOPA Air Safety Foundation

*ASF has a safety advisor **(www.asf.org/nontowerSA)** and an online course **(www.asf.org/sir**) relating to communications procedures and operations at nontowered airports. They are a highly recommended refresher especially for those who exclusively fly IFR.*

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PREVENTIVE MAINTENANCE: TAKE THE ASF QUIZ CHALLENGE

Quiz answers

1. c. No, you may only perform preventive maintenance on an aircraft you own or operate (provided you hold at least a private pilot certificate if the work is to be done on an airplane, and a sport pilot certificate if the work is to be done on a light sport aircraft).

2. b. No, propeller repairs are not considered preventive maintenance. Remember to check your propeller times since they also have TBO times.

3. a. True. According to Appendix A to Part 43, you may replace "side windows where that work does not interfere with the structure or any operating system such as controls, electrical equipment, etc."

*Go to **www.asf.org/mxquiz** for the complete quiz and your score.*

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