

Small Cost

BIG BENEFIT

A Look at Lifesaving Aircraft Safety Enhancements

When I worked at an airline, I wondered about the wisdom of issuing certain safety regulations, such as requiring fire-blocking seats. The rationale was to increase crashworthiness, but what was the point? The new regulations cost a lot to comply with, and crashes were inevitably fatal, right?

After I went to work at the FAA, the reasoning became clearer. My supervisor had a drawer full of aircraft accident photos. Pulling one out he would say, "This accident was survivable, but people died. Requiring (fill in the blank) would have prevented that."

Last year, the FAA's Alaskan Region completed a study of all 647 accidents in Alaska between 2004

and 2009. Of these, 97 were fatal causing 133 deaths. The team determined that about 75 percent of the fatal accidents were survivable. These findings led the team to highlight several potentially lifesaving equipment strategies.

It is important for GA pilots and aircraft owners to evaluate the available safety equipment and make decisions based on cost and effectiveness. It may surprise you to know that many highly effective equipment strategies to increase crashworthiness are relatively inexpensive.

Here are a few safety enhancement items you might consider.



Photo by James Williams

Shoulder Harnesses

The Alaska study showed that 20 of the 133 lives might have been saved by the use of shoulder harnesses rather than just lap belts. Shoulder harnesses distribute loads more evenly, which reduces internal injuries and helps keep an individual's upper body and head from hitting the instrument panel.

One accident in particular provides a compelling case for shoulder harnesses, especially in the passenger seats. In the crash of a de Havilland *Beaver* with nine onboard, the pilot and front-seat passenger had shoulder harnesses and survived. Of the six passengers in the back without shoulder harnesses, only one survived. Shoulder harnesses in the rear seats could have reduced the injuries, allowing the passengers to escape from the post-crash fire.

Where to get them. Many aircraft manufacturers, supplemental type certificate (STC) holders, and aircraft supply stores offer kits to retrofit shoulder harnesses in aircraft delivered without them. While a four- or five-point harness is best, it may be difficult or expensive to install. A three-point harness provides protection and is a less costly option. Remember that a shoulder harness must be installed and worn correctly to be effective. Find information on kits by aircraft make, kit manufacturers, and guidance on installation at www.faa.gov/aircraft/gen_av/harness_kits/.

How to install them. There are many STCs for shoulder-harness installations. It is possible in some aircraft to install shoulder harnesses with a field approval. See the FAA shoulder harness Web site for more information.

Cost. Many kits are available for under \$500 per seat plus the cost of installation.

Inflatable Restraints

The Alaska study showed significant safety benefits from inflatable restraints, or air bags: 38 of 133 lives may have been saved. This is because,

when used in conjunction with lap belts and shoulder harnesses, inflatable restraints reduce the flailing of limbs as well as the impact with hard surfaces that lead to serious injuries. Because aircraft inflatable restraints are installed directly in the shoulder harness or lap belt, they inflate away from rather than toward you. This means that smaller adults and older children, who do not need a car seat, can safely use them.

Where to get them. There are STCs to install inflatable restraints for many aircraft models. Search the STC database at http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSTC.nsf/Frameset?OpenPage in the FAA's online Regulatory and Guidance Library for "inflatable restraints" or "air bags." Kits are also available for many light-sport and experimental aircraft models.

How to install them. Inflatable restraints require an STC to install in type-certificated aircraft. In most GA airplanes, inflatable restraints, which are usually installed in a shoulder harness but can also be installed in a lap belt, are only a little more complicated to install than a regular shoulder harness.

Cost. Kits are available for about \$1,000 per seat plus the cost of installation. Note that the shoulder harness is part of the kit.

Helmets

Of the autopsy reports the Alaska team reviewed, all mentioned severe head injury as a cause of death. The team predicted that if helmets had been worn, 33 of 133 lives might have been saved. Pilots and passengers should wear a helmet during high-risk activity, e.g., off-airport operations, especially for two-seat aircraft that have a lot of aircraft structure in close proximity to the head. Get a comfortable helmet with a good fit so you will wear it. Consider helmets for rear seat passengers as well. Make sure the helmet is rated to protect your head from impact loads and that it is not simply a way to hold your headset in place.

Photo 1 (on page 20) illustrates a compelling case for the use of helmets. The pilot who was wearing a helmet walked away. The passenger who was not wearing a helmet was not so fortunate.

Where to get them. Aircraft crash helmets are available from most aircraft supply companies.

How to install them. No additional FAA approval is required.

Cost. Many are available for under \$500.





Photo 1



Photo 2

406 MHz Emergency Locator Transmitter (ELT) or Personal Locator Beacon (PLB)

The team’s study of the Alaska fatalities showed that 12 of 133 lives may have been saved had the aircraft been equipped with a 406 MHz ELT or a GPS-based PLB. The November/December 2010 issue of *FAA Safety Briefing* (see page 23) includes an article about how 406 MHz ELT devices work. It shows how they can make the difference between being rescued in a couple of hours versus several days, particularly if you often fly over remote areas or areas with a lot of tree cover where a downed airplane is hard to see. In many cases, quick intervention by medical staff can make the difference between life and death.

Although a 406 MHz ELT is quite a bit more expensive than a PLB, it is also more effective. The 406 MHz ELT’s extremely reliable G-switch is automatically activated when the pre-set crash loads are exceeded. Therefore, even if you are unconscious, the 406 MHz ELT will start transmitting. The battery life is also considerably longer for the 406 MHz ELT. In addition, since the 406 MHz ELT transmits to a geosynchronous satellite, it does not have to wait for a satellite to pass overhead before the signal is received. Finally, 406 MHz ELTs can be equipped with a remote activation switch. If you have the remote switch in your aircraft, you can trigger the ELT in the air as soon as you are aware that you need to make an emergency landing.

Look at Photo 2. Can you locate the helicopter? In this accident, it took almost 22 hours for the rescuers to locate the crash site. With a 406 MHz ELT or PLB the helicopter could have been located much faster.

Where to get them. Most aircraft supply companies sell 406 MHz ELTs. PLBs are also available at sporting goods stores and similar retailers.

How to install them. A 406 MHz ELT requires an STC for installation. PLBs require no additional FAA approval.

Cost. 406 MHz ELTs are available for \$800 to several thousand dollars. Make sure you factor in the cost of antennas, mounting hardware, and installation. PLBs are available for between \$100 and \$300.

The Bottom Line is Safety

We tend to think of the bottom line solely in terms of monetary costs, but consider these numbers: For as little as \$1,200 you can purchase a PLB and helmets for yourself and your passenger in a two-seat airplane. For a four-place aircraft, you can equip all four seats with air bags and purchase a 406 ELT for around \$4,800 plus the cost of installation. It could cost a lot more to remodel your kitchen or take a family of four on vacation.

We all do much to operate our aircraft safely; no one wants to experience an aircraft accident. But despite our best efforts, the fact is that flying is inherently risky and accidents do happen. I hope we all continue to have many hours of accident-free flying ahead. But if the unexpected happens, you will not regret the money you spend now on crashworthy features for your aircraft. The lives you save could be your own and those of your family and friends who fly with you. ✈️

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For More Information

FAA’s shoulder harness Web site
www.faa.gov/aircraft/gen_av/harness_kits/

FAA’s Regulatory and Guidance Library
<http://rql.faa.gov/>

FAA’s STC database
http://rql.faa.gov/Regulatory_and_Guidance_Library/rgSTC.nsf/Frameset?OpenPage