General Aviation Safety Challenges 2008

By: Small Airplane Directorate, Federal Aviation Administration

In 2003 and 2005, the Small Airplane Directorate released informational articles for distribution through various flying organizations. These articles discussed General Aviation (GA) accident statistics and pointed pilots to tools that could help them improve their decision making and piloting skills. As the busy summer flying season is upon us, we wanted to update you on the fatal accident rate and also discuss one of the leading causes for accidents in general.

What is the latest fatal accident rate?

According to the National Transportation Safety Board (NTSB) aviation accident database, in the first 5 months of 2008 there have been 106 General Aviation (GA) and nonscheduled part 135 fatal accidents. This is 12 fewer fatal accidents than 2007, representing a 10 percent drop from the same period in 2007. So far, 2008 is shaping up to have the lowest numbers in the past 10 years, which is great news. It is important to maintain this downward trend. However we are seeing an increasing trend of these accidents as the warmer weather flying season settles in.

Is density altitude a cause of accidents?

When it comes to aircraft performance and pilot procedure, a historical problem area that continues to plague aviation is takeoffs and landings associated with density altitude effects. Aircraft performance can vary greatly based the temperature, air pressure and field elevation. We relate temperature to air pressure to obtain density altitude which is defined as pressure altitude corrected for variations from standard temperature. When conditions are standard the pressure altitude is the same as density altitude.

Takeoff performance

Aircraft performance charts are based on the "Standard Atmospheric Day." It is important for pilots to understand that a standard day is not typical. Temperature changes have a large affect on density altitude. At sea level, the "Standard Atmospheric Day" temperature is 59ºF and decreases at rate of 3.6ºF per 1000 feet for the altitudes the typical GA aircraft operates in. As an example, the temperature for a "standard" day in Albuquerque, New Mexico is 39.9ºF. Certainly a 40ºF day during the summer in Albuquerque would not be considered typical. Any higher temperature, without an offsetting increase in atmospheric pressure, will increase the density altitude. An aircraft subjected to the high density altitude will not give the performance anticipated by a pilot casually reviewing the performance charts. The last standard day in

Albuquerque this year occurred on April 28, 2008 at 3:59 AM. ALL operations at Albuquerque since that date have been at higher density altitudes. It will most likely be October before another standard day is seen in Albuquerque.

Even though the surrounding terrain may look wide open and relatively flat, on a typical summer day some light airplanes could be at or close to their service ceiling before they even leave the ground. Check the density altitude and the appropriate performance charts in the airplane flight manual (AFM) or the pilot operating handbook (POH). Remember no summer day is standard.

Density Altitude Display; ©Aero Info, Inc.

Landing Performance

The density altitude can also have a big effect on landing distances. Just as with takeoff and clime performance, your landing distances will be much longer in conditions with a high density altitude. Again, it is important that you calculate your landing distances from the appropriate performance charts and use the correct density altitude.

How are landing distances calculated?

We still have a significant number of runway overrun accidents. While these accidents are seldom fatal, we think it might be enlightening to share how the certification flight test world generates your POH performance numbers.

First and foremost to remember, POH landing distance numbers typically reflect the shortest distance you will ever be able to land your airplane. Neither 14 CFR part 23 nor part 91 require any margins or factors in the published landing distances that you as the pilot use. So whether you fly a Cessna 152 or a new part 23 multiengine jet, the landing distance calculation requirements are the same. They are generated using skilled test pilots in near perfect weather conditions. We require at least 6 landings for the POH performance charts –conducted on the same wheels, tires, and brakes. So if you want to know just how aggressive our landing distance tests can be… The tires, and sometimes the brakes, are generally worn out after just 6 landings.

The landing technique that is recommended in our guidance calls for power and speed to be stabilized by 50 feet on the approach. We also recommend a smooth flare to be made at the touchdown point. Smooth as used in our guidance does not necessarily mean slow as much as it means not abrupt. A typical flare used for landing distance testing is just short of an aircraft carrier landing. The flare technique that you and I would use to show off our flying skills to our passengers will add 10's of feet if not 100's of feet to your landing distance.

Finally, if you are landing on grass, your POH may use factors that you add or multiply to the dry, hard surface landing distance numbers. While these factors are generally conservative, they are based on flight testing where the grass condition was closely controlled. We found that for average height dry grass, distances increased about 1.2 times and about 1.6 times for wet grass. Unfortunately, it is impossible to account for all of the variables associated with non-hard surface runways so we would recommend these factors as a minimum.

So perhaps you are now more aware about how the landing distance numbers are generated for your airplane's POH. We hope this information will help you to better use the landing distance numbers when planning trips to airports with short runways. During his flight test days for a small airplane manufacturer, a test pilot would frequently fly into an airport with 1,000 foot markers on the long runway (for airliners). He would periodically challenge himself against the POH numbers. If you have access to a runway with these markers, you can check the book

landing distance numbers against an estimated real distance. However, the bottom line is, when you want to land on a short runway, add a reasonable margin to the POH calculated landing distance. If the runway is shorter than the POH plus some reasonable margin, even our certification test pilots would not try to land there.

We welcome your feedback on this article as well as the articles in the past releases. You can provide us your feedback using the Aviation Safety Customer Feedback Form available on the internet at: http://www.faa.gov/about/office_org/headquarters_offices/avs/customer_feedback/air/field/. Please choose Small Airplane (ACE) from the pull-down menu and provide your comments in the space provided.