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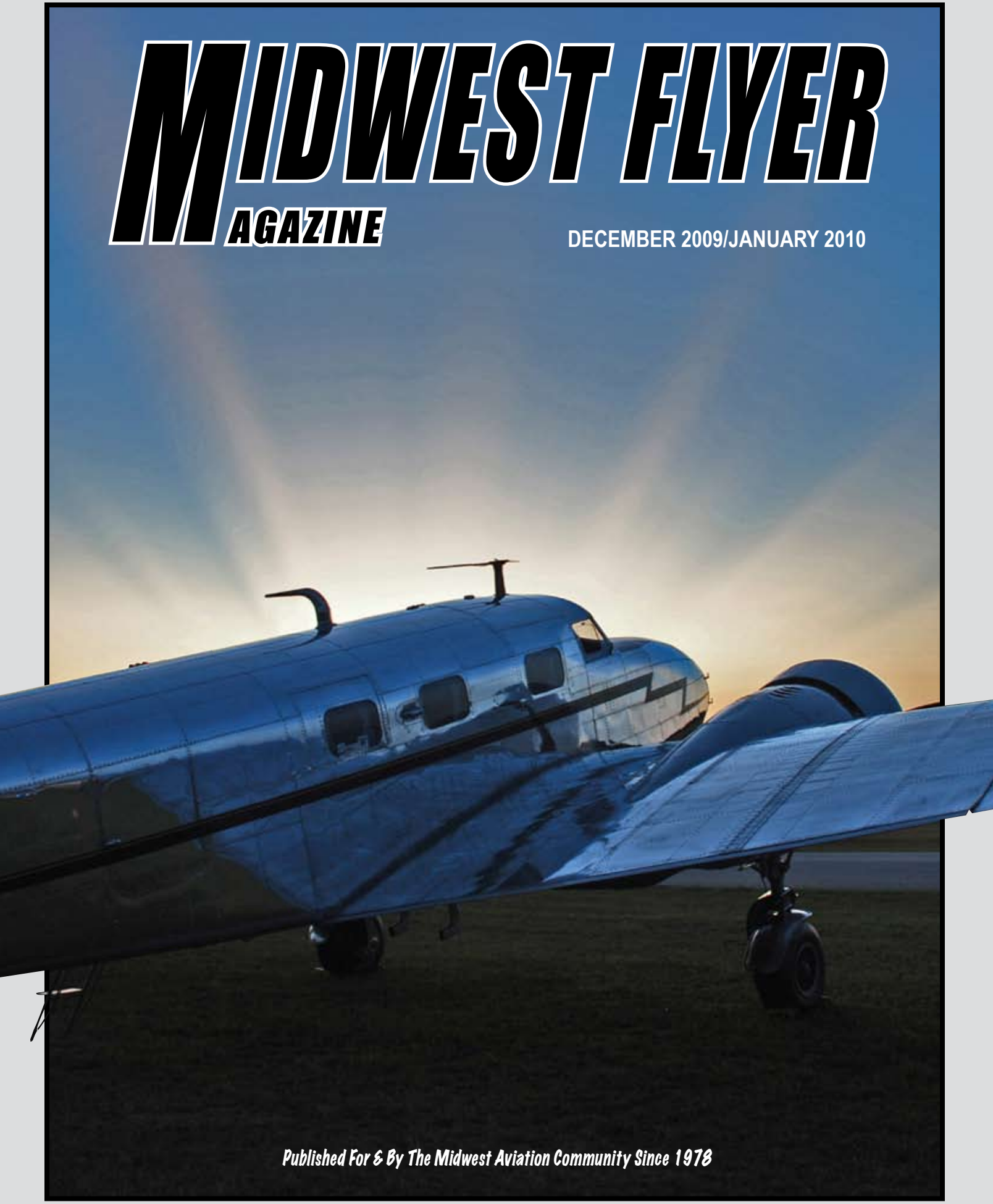

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THE STATE OF MINNESOTA PROVIDES THIS TECHNICAL BULLETIN IN THE INTEREST OF AVIATION SAFETY AND TO PROMOTE AERONAUTICAL PROGRESS IN THE STATE AND THE NATION

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You Are The Key!

You are the key to safe aviation.

by Christopher Roy
Director


Christopher Roy

The pilot is the one in charge of the flight. From the moment he/she walks out to the aircraft, until the moment their flight is completed and they climb out, the pilot remains the person responsible for the safe operation of that aircraft. From walk-around, to taxi, to flight, to landing, to shutdown and securing the aircraft on the ramp, the pilot-in-command IS the responsible party.

Everything related to the safe operation of that aircraft in all phases of its operation must be done with intelligence, clear forethought, sound judgment, and consistent care. It matters little whether you are flying a J-3 or a G-5, the principles and rules are the same. You, as the pilot-in-command, are responsible for the safe operation of your aircraft.

Bear in mind that in nearly 80% of aircraft accidents, the aircraft itself is working fine until controlled flight into terrain, spins, stalls, a runway incursion accident, or loss of control, happens. Through all these situations there is one very important and common link; that is the pilot.

Please take the time during the winter season to thoroughly refresh your memory. Take time to re-read your current FAR-AIM Manual. Schedule time to refresh your skills and proficiencies. It is a wise course of action, and an even wiser investment in yourself and your flying future.

That is why I urge you to take advantage of the winter season to review your flying knowledge and skills. If you schedule proficiency training for the coming spring, then by late spring you will be ready to maximize the enjoyment that safe flying brings.

I wish you and yours a safe and happy holiday season, and an even safer and better new year! Remember, you are the key! ❑

Safety & Awareness Go Hand In Hand

by Dan McDowell

As we approach the peak of the holiday season, it is extremely important to everyone to pay close attention to safety practices while maintaining a high level of safety awareness. Whether working, playing, or flying, it is every individual's responsibility to be alert to – and practice – safety at all times.

It isn't just in aviation that safety is important. This is the season of frost, ice, and snow. It can be something of a challenge just getting into a car to go to the airport when conditions are slippery. Thus, it is necessary to always be alert to changing conditions and the necessary safety adjustments that must be made. For instance, slowing down on the road when visibility is low, or traction is marginal. It is for most people, just common sense, but how many cars end up in the ditch each year because the driver failed to use common sense, good judgment, and practice proper safety habits?

It is no different for pilots. Every move you make with an airplane under power has the potential of affecting safety for you or others around you. You are the one responsible for your actions and safety should always be a guiding factor in the choices you make.

Being prepared for the cold of winter, whether flying or driving, is extremely important. If you get stranded in your car or if you have an off-field landing, ask yourself this question: *"Am I prepared to spend the night in the cold?"* In other words, do you have a survival kit packed and available to you in your car or aircraft? If you have one, do you know how to use it? Is it fresh and current? Will it support you and your passengers for at least 24 hours?

Be sure to inspect your kit before placing it in your vehicle or aircraft. Make sure nothing is expired. Replace items that are approaching their expiration date. Be sure your batteries, water, etc., are fresh. Take nothing for granted, because your life and the lives of your passengers – whether in a car or an aircraft – will depend on the decisions you made in preparation for the trip.

One goal of the Minnesota DOT Office of Aeronautics is to get pilots to think about these issues and to take appropriate action to ensure you are thinking about safety. Another goal

is to help ensure that pilots are prepared to handle these situations by doing some preplanning and preparations. There are many very good informational sites on the Internet that provide lists and guides for building and packing your survival kits, and some even tell you where to get the items you will need.

Remember, safety and awareness go hand in hand. It is entirely up to you what actions you take. But remember, time spent in planning and proper preparation is an investment in your safety and the safety of your passengers. ❑

The Guesstimated Prognostications

Every winter, we listen to the weather forecasts before and during snow events. It seems odd that with all the technology available to them, the weather folks on TV and radio are often "guesstimating" the amount of snow that will fall at any given location. It begs the question, *"why can't they guess better than they do?"* Why do they predict 3 to 5 inches of snow and we get 8? Or, why do they predict 8 and we get 2? Well, there is actually a good answer for each of those questions.

Walt Petersen, an atmospheric scientist with the National Space Science & Technology Center (NSSTC) and the University of Alabama-Huntsville (UAH), says, *"Snow is a huge problem. It turns out that estimating snowfall is very hard to do with radar. Rain is easier because it always consists of simple liquid-filled droplets. Radar echoes from rain clouds can be converted into rates of rainfall with fairly good precision."*

He continues, *"But frozen precipitation, such as snow, is much more variable. Famously, no two snowflakes are alike. The differing sizes, shapes, and densities of individual flakes mean they won't all fall at the same speed, complicating efforts to estimate rates of snowfall. Also, snowflakes have lots of crazy angles and planar 'surfaces,' which can make tricky radar echoes."* Petersen adds, *"The problems don't end there. Ice and snow have variable dielectric behavior depending on how much ice and how much air is contained in the particle."*

(Note: The dielectric constant of a substance tells how strongly the substance will interact with a radar wave.) And for you electrical engineers and purists, the **relative static permittivity** (or **static relative permittivity**) of a material under given conditions, is a measure of the extent to which it concentrates electrostatic lines of flux. It is the ratio of the amount of stored electrical energy when a potential is applied, relative to the permittivity of a vacuum. The relative static permittivity is the same as the relative permittivity evaluated for a frequency of zero.

Petersen adds, *"With raindrops, you are dealing primarily with water, which has a known and fixed dielectric constant. With snow, we know the dielectric constant for pure ice and we know the dielectric constant for air, but, the amounts of air and ice can vary quite a bit from snowflake to snowflake. Further, snowflakes also rime and melt. This means you can also have water on the surface – another complication!*

"Snow plays a big role in climate. When water evaporates, it carries away a lot of heat (which is why sweat cools down your skin as it evaporates). Later, when that moisture condenses inside clouds to form snowflakes, it releases this stored heat, warming the air. As more snow crystallizes, more heat is released, which in turn makes wind. When the snow falls, it takes water out of the atmosphere, leaving it drier. Snow on the ground also reflects sunlight back into space, which helps cool the planet."

Petersen concludes, *"So learning to portray global snowfall correctly in computer climate simulations is critical for accurately predicting how the real climate will behave in the future."*

In March 2007, NASA funded a suite of 59 research proposals under the agency's ongoing Precipitation Measurement Mission. The studies looked at ways to improve measurements of rain and snow from Earth orbit. Thanks to NASA Tech Briefs, Mysteries of Rain and Snow, for this enlightening information. http://science.nasa.gov/headlines/y2007/02marrainandsnow.htm

EDITOR'S NOTE: Sadly, they haven't yet found a better definition for dielectric constant. ❑

Never Fly With Inoperative Equipment

by Bob Martens

Never operate a plane with a known malfunction. The follow-up to that is that if a malfunction occurs in flight, land as soon as practical and get it fixed. Why start out with problems? Flying can be challenging enough without adding problems to the mix. The broken component or inoperative equipment might just be an item in the chain of events that leads us to an accident site.

I am willing to bet that many pilots are unfamiliar with FAR 91-213, which talks about inoperative instruments and equipment. Basically, it says that everything on our airplane is supposed to work or we don't fly. Unless you operate with an approved minimum equipment list, you must strictly comply with the procedures and FAR 91-213 to legally operate an airplane with inoperative equipment.

Far too many pilots fail to write up faulty or broken components or leave them until the annual inspection to get repaired. That is not good. Always start a flight with a healthy airplane. http://www.pilotworkshops.com/public/375.cfm

EDITOR'S NOTE: Bob Martens retired from the U.S. Air Force as a Colonel in 2000 after 30 years of active and reserve duty. He served in Operation Desert Storm as an Aircraft Commander on a C-5A. He also served as Flying Safety Officer and Chief of Safety with the 439th Air Wing. Martens has logged thousands of flight hours in both military and GA aircraft. Thanks to Bob Martens and the folks at Pilot Workshops.Com for allowing us to share this valuable reminder with our readers. ❑