RVator's Log

Newsletter of the Twin Cities RV Builder's Group

March 2018

In this issue…

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Upcoming Events

April 7 - Twin Cities RV Builders April Meeting. St. Paul Downtown Airport, MN.

See page 8.

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Minnesota Wing
Van's Air Force

Pres: Doug Weiler, 651-398-1184, dcw@mnwing.org

Sec/Treas: **Peter Fruehling** 612-578-3333, email: treasurer@mnwing.org

Shop Notes

- Doug

For many years, the gold standard in electrical components for our RV aircraft has been alternators, voltage regulars, and other items from B & C Specialty Products. If you want all of your electrons flowing as they should and continue to do so, B & C was the place to go. Enjoy this article reprinted by permission from the American Bonanza Society and author Thomas Turner.

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Successful Succession: B&C Specialty Products

by Thomas P. Turner, Executive Director, ABS Air Safety Foundation

In an unmarked, brick-and-crumbling-stucco building across from the Amtrak station in the old downtown section of Newton, Kansas, B&C Specialty Products has succeeded in something vital for the future of our Beech airplanes, which unfortunately many companies have been unable to do: hand off a small, entrepreneurial business to the next generation of owners.

I stopped by the B&C booth to see founder/owner Bill Bainbridge at Sun n Fun 2017. He wasn't there that year, but I met his sons William and Nathan and learned an encouraging story of how they are building upon their father's work. They invited me to come up to their factory (about a half-hour drive from Wichita) to see what they are doing for myself.

The company

Bill Bainbridge founded B&C in 1980, building lightweight alternators and regulators for the amateur-built ("homebuilt") aircraft industry. Bill's company got a big boost when his products were selected for Burt Rutan's *Voyager* nonstop 'round-the-world flight in 1986. Since then B&C has added recombinant gas batteries and other electrical system components to its line-up. Bill earned Supplemental Type Certificate (STC) authority and PMA (Part Manufacturing Authority) for many Beechcrafts, Pipers and Mooneys. Now employing about a dozen workers, B&C is a leader in lightweight aircraft electrical components.

The main product

The B&C Standby Alternator is very popular as a backup electrical source on Bonanzas and has been factory-standard equipment on new Bonanzas since 2000. The Bonanza standby system was B&C's first product approved for type certificated aircraft and is still the company's leading product. B&C ships two standby alternator systems in an average day, split about evenly between homebuilt and type certificated models.

The Bainbridges generously offered, and we accepted, a deep discount for a standby system for the ABS Air Safety Foundation A36—especially important since we may go "all electric" when donated Garmin avionics are installed (most likely as you read this issue).

Bill Bainbridge (center) and his sons Nathan (left) and William (right)

The transition

About four years ago Bill enticed his sons William and Nathan, who were both working in other industries away from central Kansas, to return home to begin the process of transitioning leadership to the next generation. Nathan is the business manager. He watches the finances and manages customer relations. William calls himself the "disrupter." A self-taught student of industrial management, he adapts and applies quality control strategies from larger companies to match B&C's current and forecast production rates. Together, they have successfully transformed the company while preserving most of its experienced work force.

Key to this transformation is their adoption of methods used by Toyota Motor Corporation, on a scale that makes sense in a small, family-run company. Every business day from 8 to 9 am, the entire staff and management of B&C meet to discuss production, current challenges, and ways to improve the product and workflow. "It took some time to make the change to an efficiency-based organization instead of production-based," William told me. "There are no more 'silos' of knowledge or information. We lost some people" who did not adapt to the new way, "but most employees embraced the strategy." Now the entire work force is "constantly focused on improvement and efficiency, to go from being a very good company with very good products to being excellent."

Bill Bainbridge is still in the office every day actively helping manage the company and his, Nathan's and William's daily responsibilities vary and often overlap. That's part of the "no silos" philosophy. The brothers live in Wichita and make the 30-minute commute each way together, giving them an extra hour each day to share ideas and work problems. Nathan has dreams of becoming a pilot and buying a Beech Bonanza as a personal airplane and product demonstrator. Bill tells me he is pleased and happy his sons have come home and so successfully ensured the next generation of the company he built. That's rare in small aviation production businesses, and good news for owners of Beech airplanes.

The unmarked, unassuming exterior of forward-thinking B&C Specialty Products.

If you have a B&C alternator in your Bonanza (or your RV), Cheryl Hudding built it for you.

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MN Wing Newsline

- *Doug*

More RV-12s in the pipeline…

Jim Brown reports his -12 has been signed off and awarded its Airworthiness Certificate on January 12th. The first flight is on the horizon. Jim shares a hangar with Frank Huber at Anoka,

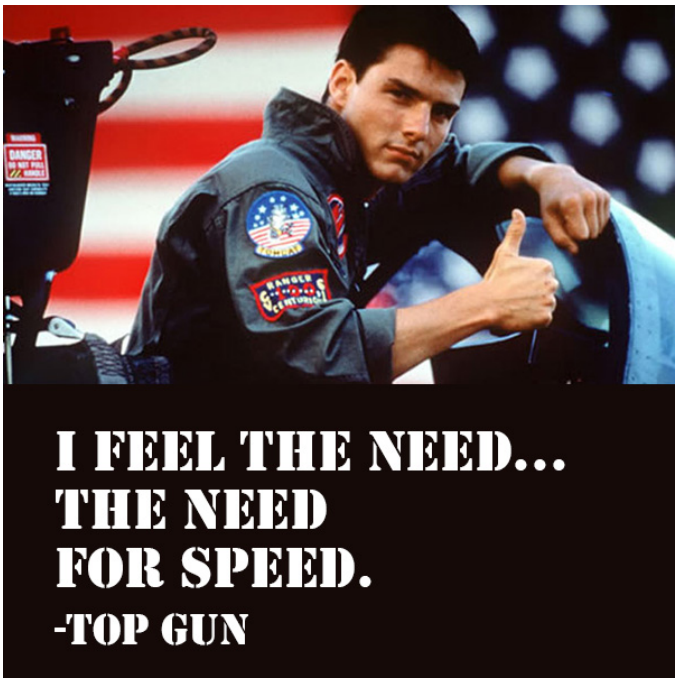
Greg Long of Johnston, Iowa sends along this update on his -12:

Just a quick note on the build progress of my RV-12 (N719VA reserved). Here's a picture with main gear now attached. I hope to get the nose wheel attached by sometime this weekend. Then I will be able to move the fuselage around and outside my garage into the driveway to attach the wings for another step in the build. Should attract some looks from the neighbors. Then the wings come back off to go back in the garage and the tail cone attached, etc. It has been a slow build in my basement and cold non-heated garage but enjoyable. Here is a link to my builder's log if anyone is interested. www.gregsplane.com

RV-7 Musings

- *Doug*

Remember this line from the movie "Top Gun?'



I can recall many years ago when I flew a Cessna 182 for the very first time. It was SO fast!!! For years I had been motoring around with students in Citabrias and Cessna 150s. When our flight school bought a ragged 182 as a "high-performance" machine, it seems like a rocket ship. It didn't have any kind of ground speed readout but I know it could push 130 knots on a good day if you didn't mind burning 12 gph.

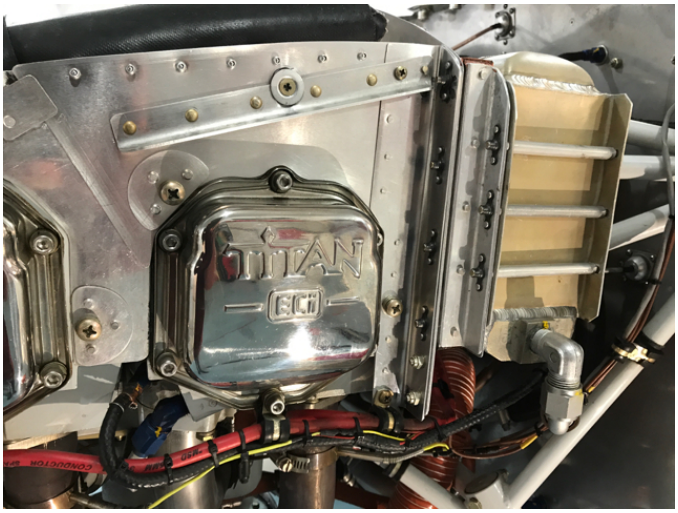
When I built my RV-4, my rationale was if I was going to spend multiple years building my own airplane, it was going to blow my socks off. So I planned on 180 hp with a constant speed prop. Oh, it was so worth it!! Especially on those cold winter days with about half tanks. It was off the ground well before I had full throttle and I could see 3000 fpm for a brief time on climb out. And it would cruise along pretty easily at 170 knots TAS

The RV-7 is not quite as peppy but still not a slouch. I can count on 165 knots most of the time at altitude. It would be hard to go back to a 172 or something like that. So it was pretty rewarding to see this on the GPS a couple months ago coming back from a pancake run to Brainerd:

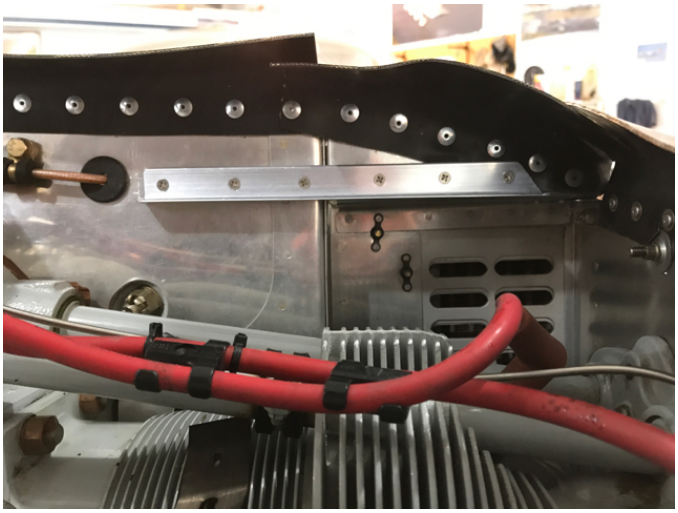
True I had a 60-knot tailwind but it was fun for a few minutes!!!

On another note, last month I had 22DW down for a leaking prop governor. This has happened before so I sent it over to Maxwell's prop shop at Crystal for some new O-rings. One day while I had the cowl off, Tom Berge stopped by the hangar to chat. He probably wasn't there 2 minutes before he informed me my engine baffling was cracked. OH?? Sure enough, eagle-eyed Tom pointed out a series of cracks in the area near the oil cooler. Now why hadn't I seen those? Yes, it's true. Tom can see things us mortals pass right over.

So a week or so later, I had reworked the baffling in the oil cooler area with additional stiffening and an angle brace which really made a big difference in "wiggleness". BTW, all of these improvements used 6061 T-6 aluminum, which has FAR less tendency to crack than 2024 T-3. Hopefully this will last far longer than before. Time will tell!!



Made an extra angle piece in the corner. The cracks were coming from the nutplates holes. New material .032 6061 T-6



Added angle from 6061 T-6 across the back of the baffle. Major increase in stiffness!

Van's Safety Corner 9-14-2011

COULD YOU PASS A PRIVATE CHECK RIDE TODAY?

While it seems a silly question, the answer may not be as positive at you'd like to think. Many of us let our flying skills get rusty over the years. Maybe we develop flying habits different from those we were taught; maybe some of them are bad habits. Maybe we feel that some of what we learned in training is not relevant to the flying we now do, so there is no need to practice that stuff anymore. You may have a thousand hours in your logbook, but does that automatically make you a better pilot than someone else with only 100 hours? Maybe you have only 100 hours experience, repeated ten times. Or, you may have slipped into bad habits and regularly demonstrate less skill than a much lower time pilot.

OK, assuming that you could pass the private exam today. That's fine. But you have amassed over 500 hours (or whatever) in your logbook. Could you satisfactorily perform the maneuvers and standards of the Commercial check ride? After all, the commercial exam only requires only 200 hours experience. You have much more flight experience than that, so have you been upgrading your skills during this time or just flitting about in the sky? Since you're not doing commercial flying you may not feel the need to acquire and maintain that level of skill. Well, why not? It will benefit your safety and that of

your passengers.

Let's look at one of the maneuvers listed on the commercial pilot exam; the Lazy Eight. So, why does a commercial pilot need to demonstrate skill at this maneuver? He is probably never going to do these in a King Air, let alone in the 747 he has his career sights set on. Unlike training maneuvers such as turns around a point and rectangular patterns, the Lazy Eight has no direct application to day-to-day flying. However, the Lazy Eight is an excellent training maneuver for practicing control coordination, along with other things. I don't think that I need to make a case for the importance of control coordination, but I'll quickly do so by asking one simple question:

Q. What is the difference between a stall, and a stall/spin?

A. A stall /spin results from a stall encountered while the flight controls are un-coordinated.

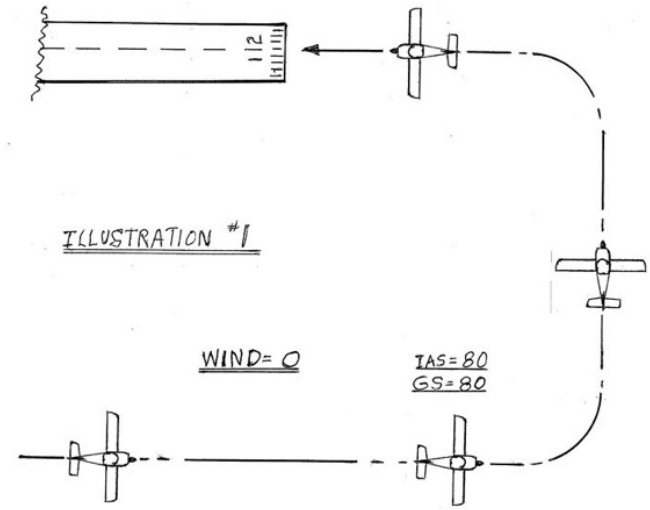
My point being that it is easy to become complacent about our flying skills and to overlook the benefits of regular stick-and-rudder practice. Particularly if we are flying tri-gear airplanes (nothing inherently wrong with that), we can too easily "get by" without exercising good stick-and- rudder skills. We need to keep our skills honed to a high level to provide us with "skill to spare" for routine flying, and "skill to survive" in an emergency.

VISUAL VERTIGO

I referred above to the "Rectangular Pattern" training maneuver. For practice, a course is selected in the countryside using roads or field section lines to describe a rectangular ground course. The object is for the student pilot to fly over this course at about 1000 ft. AGL, or typical traffic pattern altitude. The student learns to plan his turns so that he is aligned with the next course leg at the completion of each 90-degree turn. Add a wind to this practice, and it becomes more meaningful and more difficult for the beginner. Offset headings must be flown to maintain a flight line over the ground course, and adjustments must be made in the radius of turns to allow for the wind drift and the difference between airspeed and ground speed. The purpose of this exercise is obvious; it prepares the student to be able to fly an airport traffic pattern in a manner, which result in flying a ground track, which will position him for landing approach whether or not there is a wind.

Basic as the traffic pattern is, pilots still die while flying it. Why? Let's look at a couple of traffic pattern illustrations to better understand one way this can happen.

Illustration 1 shows an ideal situation where there is no wind. We see the airplane tracking over the ground according to the heading of the airplane.



In illustration 2 we factor in a moderately strong wind at a 45-degree angle to the landing runway. This illustration shows a correctly flown pattern with the pilot having made heading corrections to compensate for wind drift. It also shows that he needed to begin his turns a bit sooner because of the higher ground speed and the fact that he needed to turn more than 90 degrees from one crabbed angle to another. He is able to maintain a desired ground track and arrive at the runway threshold at a desired altitude and airspeed. In reality, the airplane on final approach would probably not be crabbed into the wind as shown. A forward slip is the preferred wind correction technique, but too difficult to illustrate here.

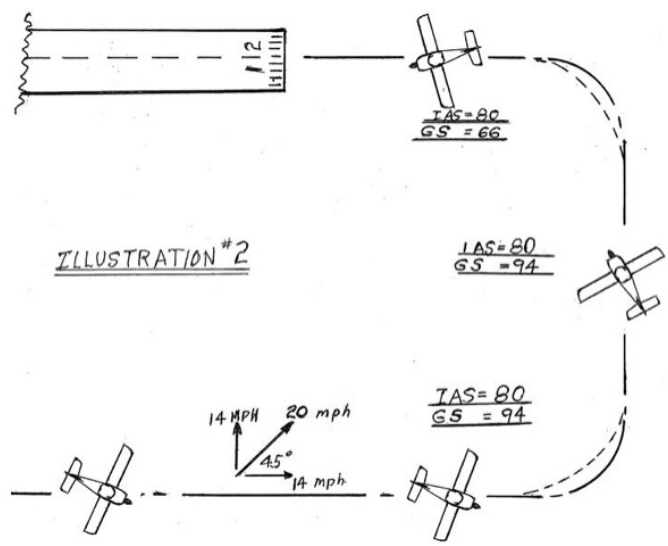


Illustration 2

Illustration 3 shows a pattern flown without proper allowance and correction for wing drift. We have overlain the no-wind ground track for reference purposes. Please note the differences in IAS and GS (VRS).

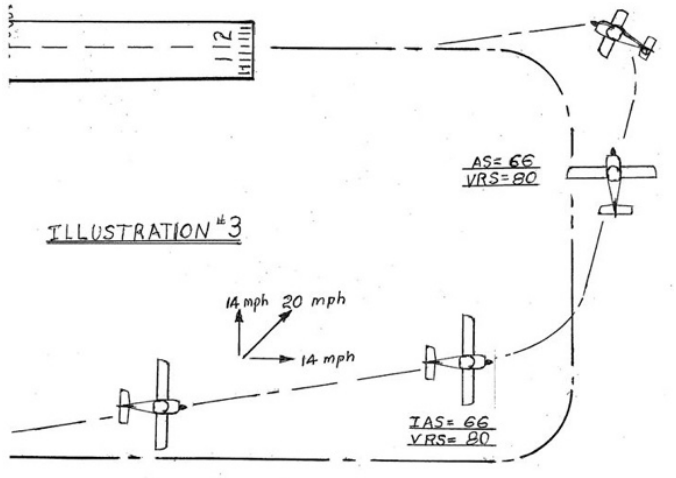


Illustration 3

One very, very important factor plays into this scenario. This is what I will call "Visual Reference Speed (VRS)". I like this term because it describes the speed that the pilot visually senses rather than the actual airspeed of his aircraft. We fly by "Visual" flight rules, and obviously we are more dependent on our visual sense than our other senses. We become accustomed to the visual rate and time cues we see while flying our regular airplane in standard traffic patterns. Illustration 3 assumes a pilot flying on the basis of conditioning acquired by flying no-wind traffic patterns.

First, the pilot made insufficient wind drift correction while flying the downwind leg, causing the plane to track closer to the runway. Also, the pilot relied on "Visual Reference Speed" cues for maintaining airspeed. He subconsciously reduced his airspeed (up-elevator, reduced power, or both) because the tailwind component causes the ground speed (visual reference speed) to be higher than normal. He sensed that he was flying too fast, but he really wasn't. Then, when making the turn to base leg, he leveled out on a heading that again resulted in a drifting ground track, moving him further from the runway threshold.

The cross wind/tail wind causes the ground speed (visual reference speed) to be higher than the airspeed, thus a tendency to pull back on the control to slow down.

As he descends nearer to the ground, the visual speed reference becomes more pronounced; more overpowering. Also, because the pilot had permitted his plane to be drifted off line on the downwind, the base leg has been shortened. Too soon it is time to initiate a turn to final approach. Quite possibly, because of the tailwind component, the pilot will find that his turn rate is not progressing as fast as his angle of bank would indicate. The turn as established will result in an overshoot of runway alignment. So, he instinctively increases the bank angle and possibly adds a bit of inside rudder to "make it turn faster". This scenario has all of the ingredients of a classic stall/spin turn-onto-final accident. This hypothetical pilot was not engaging in overt reckless flying. He simply made a series of small errors, which have culminated in a disaster.

Yes, the aircraft has an airspeed indicator, but I think that sometimes pilots subconsciously ignore the instrument's indications because of the overpowering visual factor. It might be referred to as VFR vertigo, and in a sense it is. Basically, it is a disconnect between, or confusion of, our basic senses.

I mentioned the "Visual Reference Speed" cue as being the dominant sense but we also rely on audio and tactile cues. We are accustomed to the sound of the engine and the sound of the slipstream. We are accustomed to certain control pressures and feedback corresponding to certain speeds. When these senses are not in sync with each other, subliminal confusion results. This can lead to flawed judgments and reactions.

High Density Altitude.

Operating at high-density altitudes can also have similar effects. Because of the reduced air density there, aircraft will stall at higher true airspeeds. This means that, everything else being equal, higher true airspeeds and "visual" speeds are needed. When combined with winds as described above, the chances for errors in judgment increase.

Gusty Winds:
Oh yes, in this crosswind scenario we must also consider that the atmosphere we are flying in is not stable. From second to second our airspeed can vary by 5 mph or more due to whims of the atmosphere (wind gusts, or, heaven forbid, "air pockets".) The plane can be above stall speed at one moment and below stall speed a second or two later. Thus, the reason for maintaining a higher speed margin when flying approaches in windy conditions.

While this should all be second nature to experienced pilots, it doesn't hurt to periodically review and develop a subconscious awareness of it. Many pilots (and passengers) have died because of pilot error during the final minutes of an otherwise routine flight, so none of us should feel immune to error or complacent about our skills. Perhaps you have a different way of understanding of the concepts than I have explained here. That's fine. Then, perhaps this explanation might cause you to think through the procedure and get a better understanding of the reasons behind pitfalls of landing approaches.

"Dangerous Downwind Turns":
Portions of the above dissertation should help explain the long-standing misconceptions that many have had about

"dangerous downwind turns". This is the belief that a wind from behind cancels the airflow over the wing and causes it to stall. This belief was held by pilots of early era, slow airplanes; airplanes which the pilot flew more by the seat-of-his-pants than by instrument reference. In those early days, pilots may not have had the benefit of ground school training and knowledge of aerodynamic principles. Over the years pilots of certain classes of aircraft such as gyroplanes and ultra-lights have rediscovered this phenomenon. Since these are all slow aircraft, the tailwind effects and visual mis-cues are more pronounced. Many pilots of these aircraft may also have had limited training in aerodynamic theory.

I know that when flying a windy landing pattern in my long wing, less maneuverable sailplane, I need to be much more attentive to this phenomenon than when in a higher speed powered aircraft. I have experienced the sensory miscommunications described above, and find that it takes a strong conscious effort to overcome them.

Sometime when you are landing in a strong wind, particularly a strong cross wind, pay close attention and see if you can identify the phenomena I have described. Hopefully this will lead you to a better understanding of the forces at play, and help you becoming an even safer pilot.

Enough for now. Fly safely!!!

Insurance: Considering the Worst-Case Scenario

By Barry Dowlen, reprinted by permission from The American Bonanza Society

The pilot departed his local airport in southern California on a bright clear morning in his single-engine aircraft. He planned to get in some takeoffs and landings and fly around the local area. The day ended with the aircraft crashed in the wooded hills not far away, and hundreds of acres of hillside set ablaze by the ensuing fire. The NTSB was unable to determine exactly why the aircraft crashed but classified it as Controlled Flight into Terrain (CFIT). The pilot perished in the crash and there were no passengers on board.

Over 30 homes and as many automobiles were destroyed by the fire. The cost incurred by local municipalities to control the fire soared to over one million dollars. The total claims were well in excess of $10 million and the policy had a $1 million limit.

Third-party liability claims began to pour in over the next few months. Some of the homes and autos that were destroyed in the fire were covered by homeowners' insurance, and those insurance companies were subrogating against the pilot's estate—in other words, suing the deceased pilot's wife and children to get back the money the companies had paid homeowners in claims. Some homeowners themselves were also suing for their loss of use of their homes and automobiles, and for the diminished value of their property. The case eventually went to Federal court. The pilot's family, who were still grieving the loss of their father and husband, were potentially facing financial ruin.

The Federal judge ordered all parties to mediation. The estate of the pilot, the insurance carrier, and the thirty plus claimants—*and* their attorneys—all showed up to hear what the judge had to say. Would the insurance carrier be forced to pay? Even if it did, how would the $1 million policy limit be divided among so many claimants who collectively were looking for ten times that amount? If the court could not settle the claims within the policy limit, the estate might be forced to sell assets to pay for the damages and the legal costs. You can imagine the added stress on the pilot's family.

None of us like to think about the possibility of such a dramatic scenario. But the situation I describe is based on an actual case. The pilot probably never imagined that the local flight could have turned so disastrous, destroying so much property and disrupting so many lives. But it did – and there was not enough insurance in place to pay all the potential claims. His family was left, as they say, "holding the bag."

All too often when we discuss higher liability limits with our clients they often say something like: "If I have an accident I probably won't be around to worry about the consequences, so a lower limit is fine for me." No one really likes to think this could happen to them, but I think this story is a good example of why every aircraft owner should at least think about purchasing higher limits of liability. Obviously, there is no realistic way to insure against every imaginable scenario. But just having an extra million dollars of coverage can mean the difference between getting a claim settled and going to court. The cost might be more affordable than you think. For most aircraft owners, we can double the most commonly purchased limit of liability (a $1 million limit with $100,000 per passenger) for less than $50 a month.

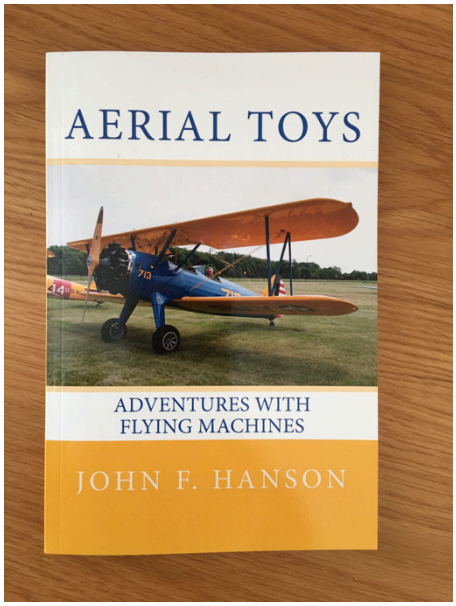
Luckily, this story did not get worse for the family. The plaintiffs agreed to settle their claims for much less than they were asking. Perhaps there were not enough assets in the estate to justify a lengthy and costly trial. But that is not always a guarantee that a plaintiff will not push a case forward. There have been many instances where jury awards have far exceeded the assets of an estate. Facing the worst-case scenario, you can be sure that the family wished that higher limits had been purchased before the accident

Twin Cities RV Builders Group Spring Meeting

Saturday, April 7, 2018, 10:00 am
St. Paul Holman Field Terminal Building

Northwest Airlines retired captain John Hanson began dabbling in airplanes when he was just a small lad of two. His entire life has been intertwined with all facets of aviation from flight instructing and charter flying to a 40 year career at NWA. John retired from the coveted #1 slot on the pilot sceniority list.

On October 9, 2002 during a flight from Detroit to Tokoyo, Captain Hanson's Boeing 747-400, with 386 passengers on board, experienced an uncommanded rudder hardover which rendered the jumbo jet nearly uncontrollable. For two hours he and his crew fought "The Whale" through a combination of full opposite rudder and aileron and asymmetrical thrust. The successful emergency landing at Anchorage garnered the crew of NWA flight 85 the Air Line Pilot's Association's Superior Airmanship Award. The Discovery Channel Canada later did a documentary on this incident which appeared in the TV series "Air Emergency".



John has owned 21 different airplanes over the years and has written a book titled "Aerial Toys, Adventures with Flying Machines."

Welcome John as our guest speaker for our April meeting. Not only will he relate the events of NWA flight 85, but he'll also talk about his life in aviation and have copies of his book for sale.

Holman's Table, the new restaurant at STP will be catering our gathering with coffee, juice, water, and breakfast goodies. Check the website for updates at www.mnwing.org

Directions:

From US 52 in St. Paul, exit at Plato Blvd. Follow signs to Holman's Table on Bayfield St. at the "old" terminal. Parking is opposite the building. Enter the main entrance and turn right down to the conference room at the end of the hall. If you are flying in, parking is available directly in front of the terminal building.

Questions? Call Doug at 651-398-1184 or dcw@mnwing.org