

Tower Talk

John Livingston Chapter

January 2015

Upcoming Events:

January Chapter Events

- 6 - Tuesday, 7:00:
Board Meeting, Airport Conference Room
- 20 - Tuesday, 7:00:
Chapter Meeting, Airport Conference Room

Iowa DOT Calendar:
www.iowadot.gov/aviation

The 227 Holiday Happening Christmas Party & Gift Exchange



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Thank you to everyone who made the evening such a joyful celebration. Special thanks to Rex Pershing, the Master of Ceremonies for the gift exchange, and to Ann Campbell and Richard Shepherd for the delightful decor.

The EAA 227 Club Fly Out by Richard Shepherd

***“The
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FLY OUT: a rather simple, blasé term used by pilots to describe making plans to travel via flight from one destination to another. To the layman this type of event might sound uninteresting and something to dismiss as being uneventful and rather dull.

Nothing could be further from the truth for the pilots who make the decision to join their fellow flying club members on a “FLY OUT” for either breakfast (Mason City), lunch (Monticello), a BBQ (Independence), even an annual 4th of July Celebration (Iowa Falls) or anywhere else we might travel across the sky that we all find so irresistible. The opportunity to enjoy 1) flying, and then, of course, 2) sharing that interest with others with the same hobby as it becomes an exciting adventure in itself and then grows into a memorable chapter in pilot’s log books.

I believe our EAA Chapter 227 is very lucky to have as a member someone who is as passionate about flying as John B. As our club’s “Flying Czar” he is always checking the weather forecast to ensure all who want to fly along will have a clear weather, blue sky adventure. With help from other knowledgeable and well-traveled pilots in the club, he always seems to pick a tried and trusted airport to travel to that offers adventuresome air travel (Prairie du Chien),

an interesting FBO to wander through (Amana) after arrival, and a mechanically sound courtesy car (the use of the Luxury Caddy at Ankeny) to reach a quaint establishment to eat at and enjoy great conversation and fellowship.

The experience alone is priceless. From the beginning flight planning practice as the PIC to successfully navigating from point A to point B, for me it’s a great way to stay sharp at this well needed skill. Flying along with a constituency is a fun challenge to practice great air-to-air communication with each other. On another level it is perfect practice to build a mental picture, to keep each aircraft’s location in your mind while it moves through the sky. That way you can start to gauge how you’ll all line up to come in on approach at the destination airport. On a fun fellowship level, to chit chat about either how much or how little fuel each plane is burning or how high of an altitude each plane has reached or how fast each plane is cruising at or what the wind direction is doing at different altitudes, very much keeps the travel time mentally engaging and interesting.

Getting to experience flying with others in our club and being able to ride along and observe other pilots handling their aircraft also has given me great insight into how others handle flight itself. From one

such adventure returning to Waterloo with Doug M., we were a bit high on approach I thought, or maybe Doug wanted to just share his skill of maneuvering his amazing RV, but we turned the tightest, fighter jet 360 off the end of runway 18 to scrub off the height. It truly impressed me and showed me an unforgettable option I had never experienced. Another example was the time Chuck R. asked me to be his instrument safety pilot while he shot an instrument approach from just off his private strip into Waterloo. To watch how he managed the cabin and radio workload while flying and seeing firsthand how the progressive technology he used to line us up perfectly on runway 30 without ever looking up off the Cessna’s instrument panel was quite inspirational for me to start thinking more about getting my instrument rating.

Reaching the “Fly Out’s” destination of course might sound like half the fun for the day is over. Not True. I have to tell you about the time the destination airport was Viroqua, WI—our arrival of, I believe, 16 aircraft at the small airport field was quite the spectacle.

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The EAA 227 Club Fly Out from page 2

Enough of one that it brought out some of the townsfolk to the fence line asking “what is going on— what are you all doing here?” Talk about having a puffed up proud chest that day. Who would guess, us regular little ole’ pilots brought townsfolk running to the airport. Hmmm, I wonder if we made the local news that day.

There are basically two important parts to the arrival destination that can’t be missed. Firstly getting to walk through the mini air show these fly outs always seem to become is exciting for those of us who appreciate all types of aircraft. Over the past couple of years, I can remember coming across quite a few aircraft you don’t usually see just sitting around our area. I remember after the fog cleared at a Boscobel fly out this past fall, there were over 30 different planes parked on the field. Some that I remember from walking around and commenting on with other pilots in the club were a Diamond DA40, sleek and sexy, along with a Cessna 414, large and powerful. Other exciting aircraft I have come across and noted in my log book have been a Socata TBM 850 at Blue Earth, a Ford Tri Motor at Albert Lea, and a Cessna 208 Amphibian at Council Bluffs.

The second important piece of the day’s mission is to try and make a choice of what you’re going to eat. Some of the destinations have really made it hard to decide. Do you have another piece of pepperoni pizza or chicken at the Grinnell Pizza Ranch, do you have a hot fudge sundae or strawberry dilly bar at the Albert Lea Dairy Queen, do you have the ham and cheese omelet or a big stack of pancakes at the Piccadilly Lilly at Lone Rock? This becomes a very important part of planning your return trip home as far as weight and balance is concerned.

The return trip to home base is a bitter sweet part of the day for me. Yes, we always have a great time flying, laughing and sharing flying notes and breaking bread together while some conversation always comes around about this engine or that heater or what tires to buy for an RV 12. But returning home means we all get to complete our preflight check, start the engine, wave to one another as we taxi out for position and then roll on out with engines roaring at full power, watch that airspeed indicator get to speed and pull back ever so gently to again break the bond of gravity and split our ways back to our respective destinations.

I looked back through my flight log today and as of September 5th of 2012 I have been PIC for 43 “Fly Outs” taking 46 different passengers along on the day’s “Blue Sky Adventure” across Iowa, Wisconsin and Minnesota. I have had the honor of being asked to ride along as co-pilot with 5 of my fellow EAA 227 Club members on at least twice that many “Fly Outs” with them in the left seat.

We all might split up and travel to different headings on the compass after these fly outs but the cherished experiences we gain as pilots, club members and friends I know are surely home based at the same fond place in all of our memories.

So the next time our Flying Czar sends out an email invite to travel to some new exciting airfield or maybe a tried and true destination to fly to—plan to come along. If you have an empty seat or 3, ask others to come with you, and get that airplane out of the hangar, dust off any anticipation you might feel, and be a part of what I guarantee will be a fun and exciting “FLY OUT Blue Sky Adventure.”

“...two important parts to the arrival destination that can’t be missed.”

“The return trip to home base is a bitter sweet part of the day...”

Tech Notes – Toe-In, Toe Out? by Mike Lewis

Landing Gears

by Marvin Hoppenworth, EAA 2519 Life

Several times when landing gears for small, amateur-built aircraft were being welded up, fellows who gathered to watch the fun have come out with this question:

“In welding up the landing gear for a conventional aircraft, should the wheels be given toe-in or toe-out? Automobiles have toe-in, so why not airplanes?”

Every time I heard it, I felt chills run up and down my spine – it was hard to imagine a cute little airplane with toe-in deliberately built into its undercarriage! But, odd questions have a way of leading to interesting and profitable avenues of thought. If you will bear with me, and try to follow my reasoning, I will herewith attempt to show that while toe-in definitely should not be used, there is, in fact, a case for the use of toe-out.

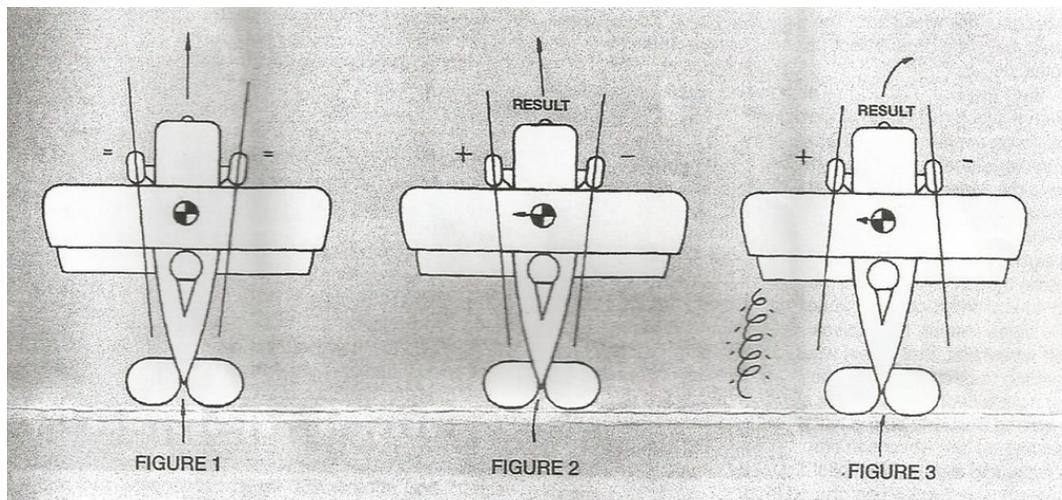
It is assumed that everyone understands what toe-in and toe-out means, but to be sure we're all speaking the same language, toe-in means that the center points of the wheels – or more properly, of the tire treads – are closer together in front than at the rear when we look down upon a pair of wheels. If unrestrained by axles, the wheels would move closer together as they moved forward. Toe-out, of course, is the exact opposite.

My first experience with toe-out was while tinkering with model airplanes. After a nice flight, it was disillusioning to see my rubber-powered models complete their landings with ground loops. I built a small scale model for the purpose of experimenting with landing roll control and from it I found that when the wheels were given about five degrees of toe-out, the landings were straight and happily realistic.

Later models provided yet another lesson. A friend was entered in a flying model event called “Clipper Cargo”, in which the model is given the greatest possible load and is allowed to take off with the timer set for a 15-second motor run. The object was to try to make the model remain aloft for 40 seconds. Under the rules, the take-off run could last as much as six or eight seconds. In that amount of time we found a model could wander off into a take-off ground loop. Seeking to help my friend overcome this problem, I told him about my experience with toe-out. He tried it and came back from the next contest carrying the trophy for first place.

Somewhat unintentionally, I next had experience with toe-in on an actual aircraft. A J-3 Cub had been used for a season of rough ski flying, and that had evidently bent both axles so they had toe-in. When the wheels were put back on in spring, this reputedly docile little airplane acted more like the proverbial “cat on a hot tin roof”. Upon landing, it sort of skipped

from one wheel to the other on its way down the runway. If the same axle bending had happened on a bigger and faster plane, the resultant ground looping tendency would have been terrific, and I doubt if anyone could have made corrections fast enough to avoid rolling the wings up.



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In short, these experiences taught me that toe-in can cause marked instability and that toe-out can, when wisely used, add to stability. I can explain it best with diagrams. Figs. 1, 2, and 3 show typical small biplanes of the kind known to be a little hot to handle on landings. I would point out, first of all, that when an airplane turns or swerves on its landing run, the tire and shock absorber on the outside of the turn compresses and the plane leans to that side. This is because, in the actual airplane, the center of gravity is an appreciable distance above the point of contact between wheels and runway. This, of course, puts a greater percentage of the plane's weight onto the outside wheel. In Fig. 1, the plane is rolling straight and there is equal weight and therefore equal friction on each tire.

But as soon as there is a swerve, however slight it may be, the plane's momentum is great enough to work on the high CG and create a leaning force as indicated by the arrows on the CG marks in Figs. 2 and 3. Also note the plus and minus signs, denoting increase and decrease of the tire-to-runway pressure. The wheel with the most weight on it must obviously have the most effect upon the direction in which the plane will go.

With toe-out, Fig. 2, the airplane is caused to move in such a direction that the tendency is to minimize the centrifugal force applied to the CG by a swerve, and the reason is that the left hand wheel has the greater load and pulls away from the incipient swerve to the right. The tendency for this layout is to pull the plane back to a straight, stable course.

But when there is toe-in, Fig. 3, the effect of greater weight on the outboard wheel is to make the swerve become tighter. Even where there is no swerve, it is possible to touch down on one wheel first, rather than on both at the same instant. If the plane in Fig. 3 touched down on its left wheel first, that wheel would immediately impart a force tending to drift the ship to the right. The high CG would then go right to work to make the ship lean to the left, further increasing pressure on the left wheel. The forces triggered by the landing on one wheel can amplify so quickly that it would be a lucky and skilled pilot that was able to stop it quickly enough to prevent a bad ground loop.

With toe-out, corrective force for small tendencies to swerve are automatically fed into the force system as soon as they appear, and the corrective effort tends to amplify itself such as to give the pilot time to make appropriate control movements. In swift, jumpy little airplanes, even a fraction of a second leeway can make the difference between an uneventful landing and a severe ground loop.

In the accompanying sketches, the amount of toe-out has been exaggerated for clarity. My suggestion for practical application of the toe-in, toe-out lessons imparted by this article is to check and double check the completed, installed landing gear on your airplane to make sure there is no treacherous toe-in. It would do no harm to put in a little toe-out. About one degree of toe-out is a good compromise, for too much toe-out would, in spite of affording a very stable landing roll, introduce the disadvantages of excess tire wear and slight drag on the take-off run.

The Luscombe Association recommends $\frac{1}{2}$ degree toe-out on each side in their service bulletin. It seems if one is not careful they can get a bad alignment during the repair of the landing gear. This may account for the comment "A landing in a Luscombe isn't over until you have the second rope on it."

The Cessna 180 maintenance manual calls for $1/16$ " toe-in. One must realize that this is at "shop weight", not "flight weight". Add another 900 lbs. in passengers, fuel, and luggage and the 180 gear geometry is such that the toe-in effectively disappears to a neutral or slight tow-out condition.

So---if your homebuilt taildragger seems to be more squirrely than it should, check your toe-in/toe-out condition. This may be the problem.

Thanks to Marv for his contribution this month. I might just add a little of my experience on this subject. When I built the Diamant, I inadvertently got a bit of toe in built into it. I really did not notice any adverse handling tendencies, but I did get terrible tire wear (even for McCreary tires!). The tire wear was very obvious as feather edging on the inside edge of the treads. A bit of correction in the toe got me to a normal tread wear.

The Safety Checklist – Icing by Dave Hummel

“...the roughness of its surface spoils the smooth flow of air...”

As we approach winter, I wanted to talk about icing for general aviation pilots. Remember icing conditions exist when there is visible moisture and temperatures are in the freezing range—(plus) +2 degrees C to (minus) -20 degrees C.

There are three (3) different types of structural icing that may occur in flight (AC 00-6A):

1. Clear Ice (also called Glaze) - forms after initial impact when the remaining liquid portion of the drop flows out over the aircraft surface, gradually freezing as a smooth sheet of solid ice.

2. Rime Ice (Milky appearance - look of a freezer that needs to be defrosted) - forms when drops are small, such as those in stratified clouds or light drizzle. The liquid portion remaining after initial impact freezes rapidly before the drop

has time to spread out over aircraft surface.

3. Mixed Ice - forms when drops vary in size or when liquid drops are intermingled with snow or ice particles. The ice particles become imbedded in clear ice, building a very rough accumulation.

What action is recommended if you inadvertently encounter icing conditions? (FAA-H-8083-15)
The first course of action should be to leave the area of visible moisture. This might mean descending to an altitude below the cloud bases, climbing to an altitude above the cloud tops, or turning to a different course.

Is frost considered to be hazardous to flight? Why? (AC 00-6A)
Yes, because while frost does not change the basic aerodynamic shape of a wing, the roughness of its surface spoils

the smooth flow of air, thus causing a slowing of airflow. This slowing of the air causes early airflow separation, resulting in a loss of lift. Even a small amount of frost on airfoils may prevent an aircraft from becoming airborne at normal takeoff speed. It is also possible that, once airborne, an aircraft could have insufficient margin of airspeed above a stall so that a moderate gust or turning flight could produce incipient or complete stalling.

Note: For reference there is an excellent YouTube video (NASA) **Icing for General Aviation Pilots** which is approximately 55 minutes in length. I first saw this video while attending a Flight Instructor Refresher Course in Moline, IL. I have my student pilots watch it plus inform those pilots whom I give biannual flight reviews.

There will be no chapter breakfast January 3rd.

See you February 7th

at the Cedar Falls Family Restaurant!

Chapter Classifieds

For Sale:

**Artex 110-4 ELT
with remote switch
and antennae.**

\$100.00

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