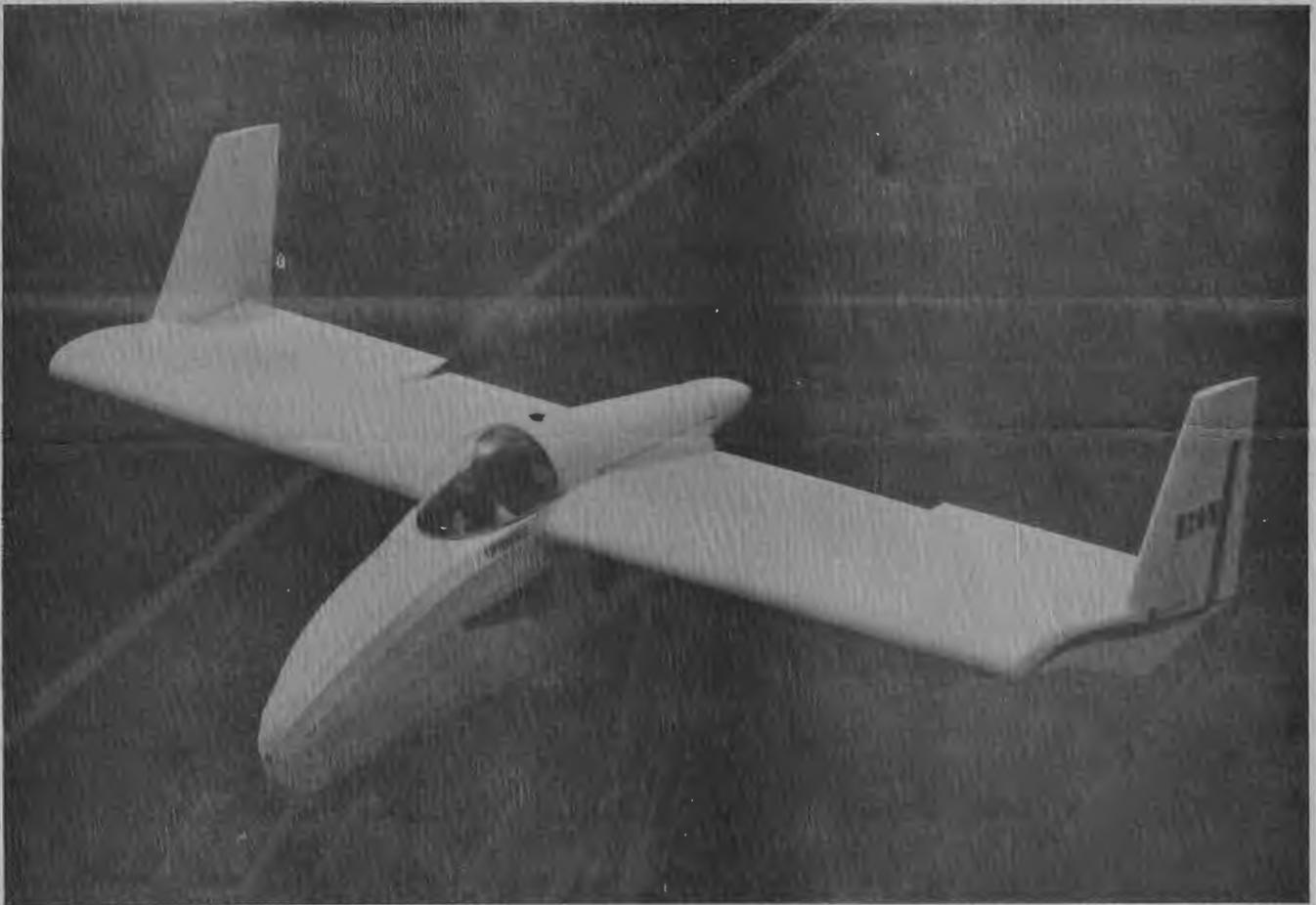


HANGAR

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AL BACKSTROM & HIS WPB-1

NOVEMBER

1979

EAA CHAPTER 168

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From Your President:

THE ELECTION OF YOUR 1980 CALENDAR YEAR OFFICERS during our October regular meeting was conducted by Pete Ohlson in a most orderly and efficient manner. RESULTS: PRESIDENT: Lewis D. (Lew) Nixon, VICE PRESIDENT: Charles Dorris, SECRETARY: Clarence (Jack) McDonald, TREASURER: Charles E. Zellner. Your considered choice has resulted in the selection of a dedicated team of Chapter Members. With a co-operative team effort, they, with each member's volunteered supplemental help, will provide for the continuity of Chapter 168 activities which we have all been accustomed to expect. Congratulations, gentlemen, there is a tremendous amount of co-operative, routine effort, required for the normal functioning of the Chapter during the coming year.

PROGRAM FOR THE EVENING: The November ECHOES cover photo of the WPB-1 Powered Plank aircraft is from the files of member Al Backstrom. Al is to be our speaker for the evening and will present a discussion of the evolution of the design concept and development to its current flight status. The aircraft is to be on static display on the AIRPARK TERMINAL RAMP before the meeting. Come early for observation of some fine aircraft construction workmanship utilized in the fabrication of this project. Again, this month, the excellent cover darkroom work was done by Bud Calley. On short notice, Judy Cobb again provided typing services for Echoes copy.

FIRST F.A.A. REPAIRMAN CERTIFICATE! Issued to chapter member was to Bill White. From now on Bill is authorized to certify that his White Special is airworthy for flight. Following close behind will be Dorman Hinchcliffe and his Cassutt Special.

ANOTHER BEST IN SHOW TROPHY! To Ben Duarte for his Varieze aircraft. Awarded by EAA Chapter 542 at their FLY-IN/AIRPORT TERMINAL DEDICATION at Killeen, Texas on 3 November. Another tribute to Ben for his craftsmanship utilized in the construction of his project.

REFERENCE BOOKS THAT SHOULD BE IN EVERY CUSTOM AIRCRAFT BUILDER'S/RESTORER'S LIBRARY Can be purchased from Government Printing Office Bookstore, 1100 Commerce, Dallas, TX 75242. Phone: 214/767-0076. Mail Order Checks to: Superintendent of Documents. Over counter sales too from 10:00 to 04:00 PM weekdays. All books postpaid.

ACCEPTABLE METHODS, TECHNIQUES & PRACTICES - AIRCRAFT INSPECTION & REPAIR ! F.A.A. No. AC 43.13-1A \$5.50. ACCEPTABLE METHODS, TECHNIQUES & PRACTICES - AIRCRAFT ALTERATIONS F.A.A. No. AC 43.13-2A \$2.75. GENERAL AIRCRAFT HANDBOOK F.A.A. No. AC 65-9 \$6.75. POWERPLANT HANDBOOK F.A.A. No. AC 65-12 \$6.50. AIRFRAME HANDBOOK F.A.A. No. AC 65-15 \$6.00. PERSONAL AIRCRAFT INSPECTION HANDBOOK F.A.A. No. AC 20-106 \$3.50.

NEED INFORMATION ON OWNERSHIP OR MAINTENANCE HISTORY OF ANY F.A.A. REGISTERED AIRCRAFT?

WRITE: Department of Transportation, F.A.A. Aeronautical Center, PO Box 25082, Oklahoma City, OK 73125, ATT: AAC-252-C. List aircraft Make, Model, Serial No. & "N" No. Ask for all copies of "Application For Registration and all copies of Repair & Alteration Form #337. Send a check to: Treasurer of United States for \$10.00 which usually covers cost. Refunds for over payment.

COMING EVENTS: 27 November, 1979 - Tuesday. REGULAR MEETING AT AIR PARK AIRPORT TERMINAL BUILDING - HIGHWAY 544 - 07:30 PM. REFRESHMENTS FOR ATTITUDE AND ALTITUDE ADJUSTMENT. COME EARLY FOR A CHAT WITH YOUR FRIENDS.

ANNUAL REGULAR DECEMBER MEETING & CHRISTMAS DINNER. NORTH PARK INN, 9300 N. CENTRAL EXPRESSWAY, DALLAS, TX. BAR OPENS: 06:30, DINNER 07:30 PM. INSTALLATION OF 1980 OFFICERS. FREE DOOR PRIZES, EXCELLENT FOOD & DRINKS, ALL TO INSURE A FRIDAY, 7 DECEMBER 1979 EVENING OF FUN & RELAXATION!

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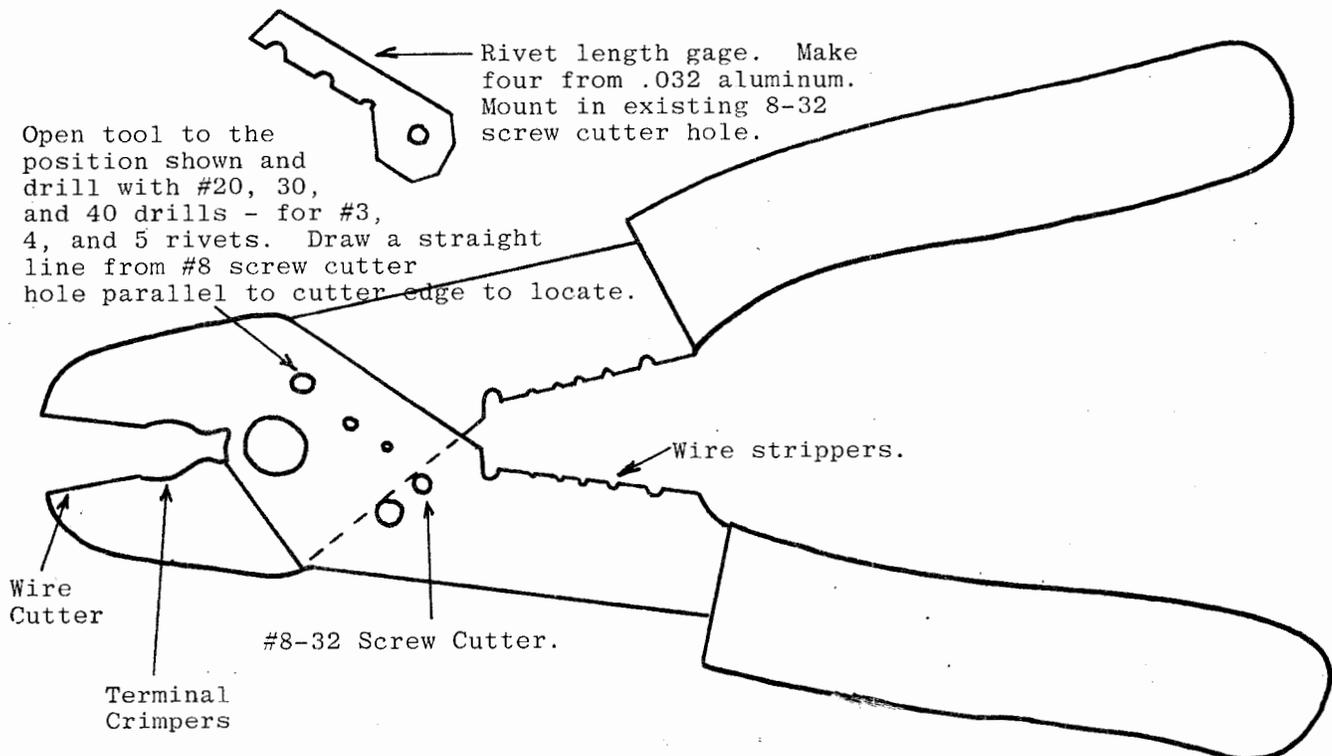
Charles Penry

RIVET CUTTING TOOL by Ken Morris, Designee 675, Ft. Worth, TX

A standard wire crimping tool makes a dandy rivet cutter with little effort, and does not destroy the crimpers.

Instructions: Open the crimpers about a third of the way. Mark a pencil line parallel to the bolt cutter edge aligned through the #8-32 bolt cutter. Drill three rivet cutting holes, #40, #30 and #20 drills spaced as shown on the drawing. Now make some length gages of .032 aluminum to mount in the 8-32 screw cutter hole. I mounted four and each one in place adds $\frac{1}{2}$ dash length to the rivet to be cut, i.e. no gages in place you get a -3 rivet, one in place you get a -3 $\frac{1}{2}$ rivet, etc. After the gages are made and mounted with a #8 screw just cut the screw by closing the handle and you get a perfect screw length. To set the gages just loosen the screw and fold as many gages in place as you need.

This thing works as well as the store bought cutter and costs about \$40. less.



HANGAR ECHOES



Editor

DICK CAVIN
10529 Somerton
Dallas, Texas 75229
214/351-4604

November 1979

We have a new and rare bird being started in Chapter 168. Last week JOHN REEVES came by my shop with an armload of "new" airplane plans. No, it wasn't the Hiperbipe, as I reported a month or so back. Certain events transpired to change his mind about the Hiperbipe and the Sorrells very generously refunded his deposit, so we now only have 3 active Hiperbipe projects in the chapter, WADE MUMAW's, JIM YOUNG's, and CLAIRE BUTTON's.

John heard the siren song for something even more exotic. He chose the FALCO! The plans that John brought by are incomplete as yet, but he really has a bundle already. The plans cost \$400, but they look very good. They are lithographed black line drawings on white paper and are very sharp and very professionally done. I did spot a gray area or two that were left up to the builder's judgement, but they didn't really appear to be any big problem. All in all they looked quite good.

A few months ago we did a report in HANGAR ECHOES about Signor FRATTI's beautiful FLACO. Actually it was only half an article, as we ran out of space that month so I'll try to bring it up to date in our December issue. I'll enjoy doing a little extra research on it in the meantime as I've always admired the graceful lines that Signor Steli FRATTI's airplane design displayed.

It's an old saw, but it's usually true that an airplane that looks good, generally flies like it looks, also. I believe we all gradually develop a 'finely tuned sense of proportion over the years and this probably has a lot to do with molding our likes and dislikes in airplanes. The Italians seem to have a flair in this department in both the automotive and aircraft designs. Without doubt their amphibian designs have manifested that certain touch for quite a few years back.

Several of these designs have been imported in the U.S. and re-labeled. The firm that imported the amphib called "The Riviera" in the U.S. was headquartered here in Dallas and we used to see the demonstrator flying quite often around here and it got along pretty rapidly. I'm sure the price tag was its downfall. That was the case with the so-called Waco "Meteor" and its sidekick, the "Vela".

E.A.A CHAPTER 168, P.O. BOX 168, ADDISON, TEXAS 75001

I remember getting to fly another Italiano amphib, the Royal Gull, which was imported by the Trecher Corporation of Milwaukee. It was a fairly large twin and was configured as a pusher and featured a gull wing, that got the props up out of the water. I never got to fly it off the water but it performed reasonably well as a land plane. A San Francisco firm had a couple of them and they took the landing gears off them and operated them as flying boats in a commuter service to and from Lake Tahoe.

To back up to where I took the right hand fork that took me over the Alps to Italy, I think the Falco design will become a popular item in EAA circles in the coming years. If a design has looks and performance the prospective builders will put cost and construction difficulty pretty low on their totem pole of priorities.

John said the tricycle gear appealed to him pretty strongly, too, since his tail wheel time is somewhat limited. I'm sure a lot of potential builders of the high performance tail draggers back off because of doubts about acquiring the demanded level of competency that tail wheel airplanes require. This would be especially true if they had nothing but tricycle gear to me on the sluggish trainers in use today.

They have sound reason to be apprehensive about tail wheel aircraft, and especially those that land pretty fast and are short and compact. This combination practically guarantees that the airplane will be close coupled and lightning quick to respond to control input in the take off or landing phase.

The pilot not trained on tail draggers gets into big trouble because of his situation reaction time primarily. In a tri gear airplane if the nose is 5 degrees off the planned ground track, it's of no great consequence, but it's another story in a tail dragger. Directional divergence tends to increase as the center of mass (CG) is behind the main wheels and is constantly trying to get around in front of those wheels. Give it even a half a chance and it will not only get there, but keep going on around in an arc that quickly becomes uncontrollable—even with full application of opposite rudder and brake together. The above scene is known as a "ground loop". Done fast enough the airplane will tip over towards the outer wing tip, dragging it and putting the airplane either up on its nose or over on its back. Either way the result is a pretty badly bent airplane—and a badly shaken pilot.

Because the reference line (center line of the cowling) ahead of him is short, the pilot doesn't detect a small amount of directional divergence. When it starts to get excessive he notices it and responds with probably too much opposite rudder. The most common error, tho', is holding opposite too long—holding it until the nose is again pointed back down the centerline. As they say in the chili commercial, "Well that's too long". The nose now continues clear on past center and now a thoroughly rattled pilot jabs in a lot of the opposite rudder and the same thing is repeated. He is constantly trying to play "catch up" to the series of wild gyrations instead of anticipating where to release rudder pressure before the nose reaches the desired point.

The real villain of the piece is usually a cross wind, tho'. On the ground the airplane's tail feathers make it try to respond like a weather vane, pointing the nose directly into the wind. The combination of momentum and an unstable, conventional (tailwheel) gear magnify this force and it tends to continue on around, trying to put the CG in front of the main wheel, that is now trying to go backward.

To better understand the forces involved, I'd like to reprint an article that will appear in the next issue of the T-18 Mutual Aid Society Newsletter. It's written by Dr. John Shinn, a T-18 builder and scientist of considerable note.

This article came about as a result of a discussion of the relative merits of aligning a main landing gear to toe out, toe in, or be fixed straight ahead. It's a point of considerable importance, as it radically affects the docility of the airplane in motion on the ground, either making it much more or much less demanding of the pilot. Take note please that a mis-aligned wheel can be corrected by the addition of tapered shims inserted between the axle and gear leg boss. The points made are pertinent to any airplane, so I think you'll find his article one that will be most illuminating and one you'll like to save as reference.

ALIGNING MAIN LANDING GEAR

by Dr. B. J. Shinn

It is my contention that in TAILDRAGGERS toe-out of the main wheels will give a STABILIZING effect, while toe-in will be an unstabilizing factor. The reverse is true for nose wheel aircraft.

Attached is an analysis for tail draggers. A similar analysis for nose wheel aircraft can be shown to prove the converse for them. I have had a lot of experience with Luscombes (8A, 8F, 11A) and my own T-18 with toe-out. The stabilizing effect is quite small, considering other stronger factors and the major concern is tire wear. With the original toe-out on my T-18 I wore out a set of tires during the first 8 hours doing taxi tests. I have had to use successively larger shims until I got it so I had uniform tire wear, (toe-out causes excessive tire wear on the inside edges of the tread).

Taildraggers with an unlocked (swivel action) tail wheel are inherently unstable. Any side force causes a swiveling action of the tailwheel, resulting in centrifugal force which reinforces the original side force. In short, taildraggers with swivel tail wheels want to ground loop! If you have a tailwheel controlled through springs it will have some swivel action. The weaker the springs the more swivel action.

The amount of effective caster in tailwheel swivel will also affect stability. The more caster the more sensitivity to turning from side loads. Another consideration is the amount of weight on the tailwheel and the coefficient of friction. For a taildragger which is almost balanced on the main gear any side load will cause the tailwheel to skid sideways and act somewhat like it had swivel action. Since grass has a lower coefficient of friction than pavement it will be worse than a paved runway. On the other hand a soft field with the tailwheel digging in will be more stable.

Finally, you must consider the amount of "gain" in your rudder and tailwheel deflection setup. This is mainly affected by the length of the tailwheel control arms. If they are too long, the amount of turn "authority" (or control) is too small; and this means you can't turn very small circles. Also you might have to make some highly exaggerated motions to keep control.

Too short of central arms mean higher pedal pressures and also high gain, so that you might tend to overcontrol and "get behind" the airplane action...especially if you also have soft tailwheel control springs.

In spite of all these factors the human is very adaptable and learns to adjust and become skilled with a wide variety of controls. I think this is the biggest factor in the said T-18 becoming a "pussycat". NO T-18 is a "pussycat"...you've got to keep on top of them and show them some skill. I think JOHN THORP did an outstanding job of balancing all the design factors and produced a very maneuverable, controllable airplane. My two boys soloed my T-18 at 16 years and my 15 year old daughter is now flying from the right seat.

ANALYSIS OF TOE-OUT ON A TAILDRAGGER

by: B. J. Shinn

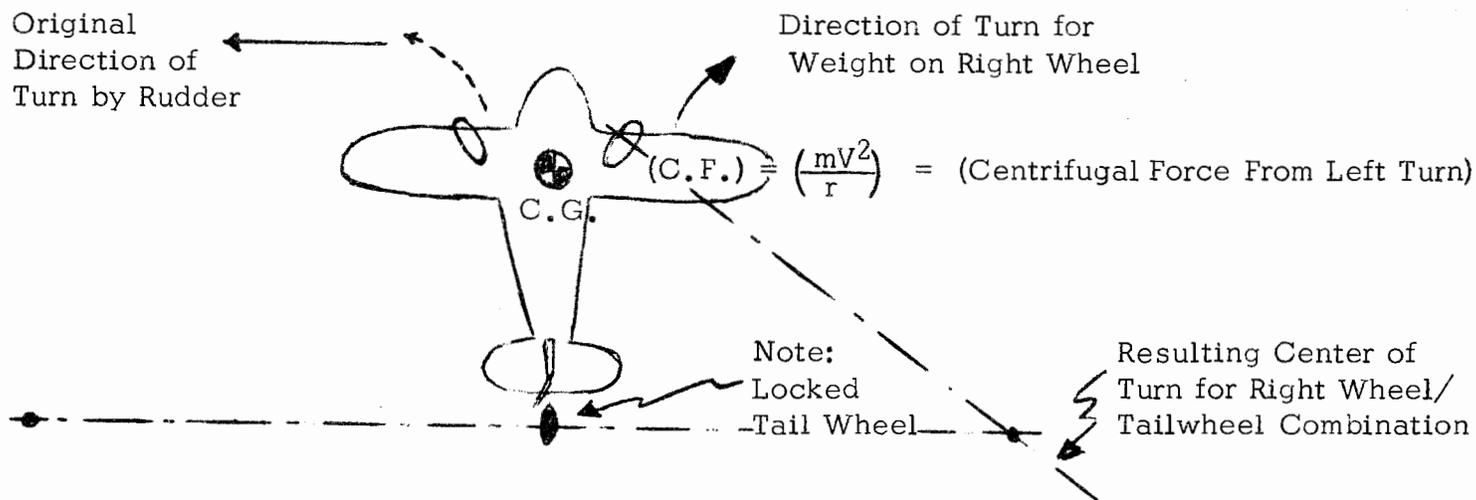


FIGURE 1. DETERMINING CENTER OF TURN

- (1) If the aircraft weight were only on the right wheel and the tail wheel, Figure 1 shows that toe-out would cause the airplane to turn to the right.
- (2) If the left rudder is pushed (or if something tries to turn the aircraft to the left) centrifugal force developed from the left turn will force more of the weight on the RIGHT wheel. This weight shift will cause the right wheel to have more traction and the left will have correspondingly less, and the aircraft will turn to the right as influenced by the turn radius as shown in Figure 1.
- (3) Once the aircraft starts to phase into a right turn, the centrifugal force will tend to shift the weight back to the left wheel, cancelling out the right turn effect.
- (4) Note that this action is stabilizing; i.e., it tends to oppose any force that would keep it from going in a straight line. (This is something like dihedral in wings, stabilizing the flight path.)

Caster Action

- (5) Note also that this analysis assumed a locked (non-swivel) tailwheel).
- (6) If the tailwheel has some degree of castering the situation shown in Figure 2 will result. Since the center of gravity (C.G.) of the airplane is behind the main gear any side force will cause a castered tailwheel to swivel. Unfortunately the direction of turn is in such

- (6) (continued) a direction as to create a centrifugal force which reinforces the original force. If uncorrected, a ground loop will occur. With enough initial momentum (and assuming no wing would drag on the ground) the tailwheel would swivel 180° and the aircraft would end up going backwards in a stable condition. (Sort of like a "nose wheel" airplane from then on.)

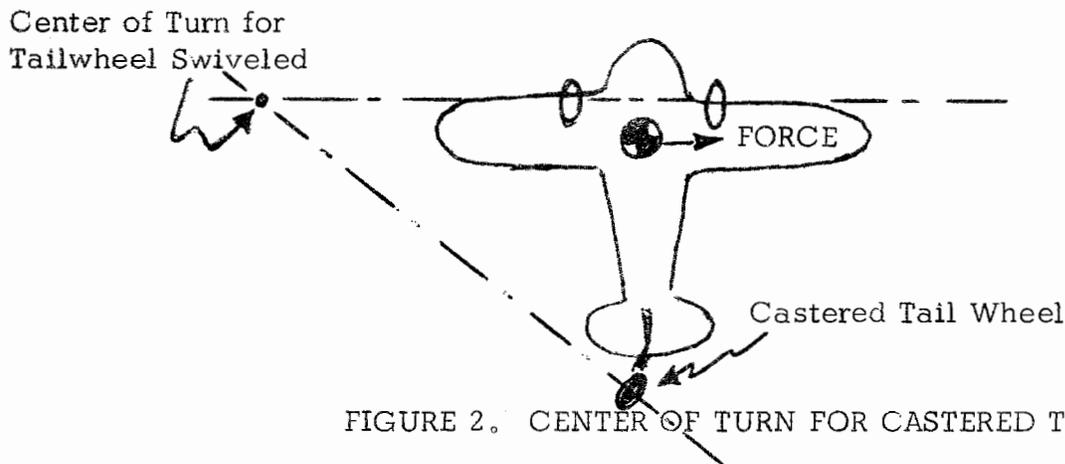


FIGURE 2. CENTER OF TURN FOR CASTERED TAILWHEEL

- (7) As shown in Figure 2, a force to the right causes the castered tail wheel to turn as though the left rudder pedal had been pushed. A new center of turn to the left is established, which causes a centrifugal force to the right. This is the same direction as the original disturbing force (which could be caused by rudder, brake, or other).
- (8) This analysis can be extended in a similar manner to show that airplanes with swiveled tailwheels tend to ground loop if they touch down with a crab angle, while nose wheel airplanes which land with a crab angle tend to turn and stably align themselves with the direction of ground velocity before touch down.

* * * * *

I think you'll all agree that the above was an excellent discourse, on a subject that has been misunderstood for years among the homebuilt fraternity.

Another factor that also radically affects the behaviour of a tail wheel airplane is the caster angle of the tail wheel fork. We are speaking of the vertical pivot axis ahead of the tail wheel axle. We won't go into a detailed explanation here except to say that the upper end of this vertical "axle" should never, never be aft of the lower point. It should slightly incline forward.

We also should point out that any and all assessments of gear or tail wheel alignment should be made with the airplane in its all-up weight condition.

In a future issue we'll go into more detail on the effects of caster and camber of how they are measured, etc., plus factors that may cause these conditions to vary (i.e., the flexibility of gear legs and tail springs, etc.).

BUILDER'S WARNING: Here's another item we recently published in the T-18 newsletter: Heu Morgan recently had a "flame out" on his Starduster Too (while taxiing out). The engine would run at idle power, but any advancement of the throttle caused it to quit. The problem was traced to a tiny rubber "doughnut" in the Aeroquip fuel line between the fuel filter and carburetor, which had just been installed. It presented enough of an obstruction to choke off nearly all of the fuel flow.

You may remember that Charley Lamb had a similar flame out on his first takeoff with his Buecker Jungmeister just as he broke ground. It was for exactly the same reason, too. He had lots of runway ahead, so he had no problem.

Ken also found these same little rubber doughnuts in newly installed Aeroquip lines to and from the oil cooler.

When installing the AN fittings at each end of a new oil for fuel Aeroquip line a tiny slice of rubber is cut off internally. If the unit isn't disassembled and blown out (or rodded out) there is an almost certainty of blockage. Professionals know this well, but it isn't a well advertised caution among the amateur builders.

MCKINNEY AIRPORT REPORT: McKinney's new airport (on the SE side of town) is now open, but if you think it's 5400 ft. of wide, smooth asphalt is a dandy place to go out and shoot a few landings you are right. But be aware that a lot of other people have the same idea, especially on weekends. Since Addison has barred touch and goes and local flying on the weekends, it's not at all uncommon for there to be 5 or 6 trainers in the pattern. As yet there is no ground marking of traffic pattern direction, but it's a left hand pattern for South landings and a right hand pattern for north landings (if you'll pardon the expression). This keeps all the traffic to the East of the airport and avoids flying over town and antagonizing the public.

BEN DUARTE continues to add to his collection of trophies. He recently went down to the Killeen fly-in (which was the dedication of the new terminal building) and the Varieze won the Grand Champion award, so again congratulations are in order for Ben.

DALE BROOKS has moved his Mustang II project over to where he works. It will be stored there until he gets the Buecker flying and can get back at it. He took the Buecker down to bare bones and most of it was the hard way—sanding, stripping, and then a light sand blasting. The old varnish was removed from the wings via a very light sand blast. It's on the way back now and he's applying the epoxy primer one bay at a time, using an airbrush. A regular spray gun wastes 75% of the paint when aimed at a piece of tubing so the use of the airbrush is a pretty slick little trick. Paint has to be thinned to 50-50 to airbrush it, but it works out very nicely. Dale also has a small amount of woodwork repair to do before he revarnishes and so he'll be thinking about putting fabric on before too many moons.

WADE MUMAW's Hiperbipe now has fabric on the entire airplane and it's really looking good. He ran into a little problem that's worth passing on. He had several coats of butyrate dope on when he started putting the tape on. He used nitrate dope to stick the pinked tape on but altho^o the nitrate filled well it simply wouldn't stick to the butyrate. This meant that Wade had to carefully remove the tape and clean up the area before he goes back on with new tape—and butyrate, this time. Everyone that visits Wade's project is impressed with the quality of his work.

JIM YOUNG's picking up speed on the welding on his Hiperbipe and is very close to being finished with that phase. His wings are still in their box but he is really getting the itch to fit those wings on.

CLAIRE BUTTON is still welding on the basic fuselage and installing the dozens of little brackets that are so time consuming. He'll be starting on the tail group next and after that will be control installation.

MARVIN BROTT's Sonerai I is back in town after a stay in Elgin, Illinois where it got an engine overhaul on the way back from OSH. If you read your October Sport Aviation you probably noticed that Marvin's Sonerai I was the winner in the "Designer Awards" Category for the best Sonerai I. That wasn't too hard a choice for the judges to make, as it's really a beautiful airplane and the paint scheme is truly elegant and most unusual.

JIM RUSHING's Mustang II also won a first place trophy for the Designer's Award category as the best Mustang II. Ol' Jim also has quite a shelfful of trophies.

It probably isn't readily apparent to a casual observer that forming the leading edge of a metal wing is a precision operation—unless you've been down that road. The skin has to fit the contour of the nose rib quire closely or else there is a problem. If one overbends the skin can't be forced down around the nose rib contour and it shows a double crease that acts like a spoiler. If you under-bend the skin has sever "gap-osis" just aft of the nose and ther's no solution except to go back and bend it some more.

DON STOVALL is one of those perfectionist types and since a tapered wing (such as his Mustang II has) is considerably more difficult he decided to have a pro do it with the proper equipment. Proper equipment in this case meant a big power operated press brake. A press brake uses a male/female die setup for accuracy that's unapproachable by other means. Don has had his ribs and spars built for years, but has held up assembling his wings until he had the fuselage pretty well complete, so he's now at the point of being ready to assemble wings. This time of year is busy for him, as some of his spare time is taken up with officiating at high school and college football games, but come next summer I'll bet he'll be flying.

DON DWIGGINS, the Editor of "Homebuilt Aircraft" Magazine called the other day to ask permission to use a portion of our Chapter newsletter in a future story. I have no idea how he got hold of one of our newsletters, but I do know that the N.L. goes far and wide. I receive letters from people all over the U.S. and Canada commenting on the N.L. and some of them even join our Chapter. Some of the letters are complimentary and some of them are not. "Homebuilt Aircraft" magazine does a good job covering unusual homebuilts and people who build them. Air Progress used to turn out some superb issues along this line, but the last few years their main thrust comes across as a slightly watered down version of "Flying", so I've devoted my armchair aviation reading to "Homebuilt Aircraft, Sport Flying, Sport Aviation," and the English magazine "Aeroplane Monthly" on a regular basis and the rest of them on a selective newstand basis.

The November issue of "Homebuilt Aircraft" has an excellent article on aircraft landing gears and wheels, with about 35 accompanying photos. They have also been running a series of articles entitled "WORKING WITH COMPOSITES". This series is from Rutan's Manufacturing

Manual and details the step by step building of a Varieze. I believe back issues are available from Werner and Werner Corp., 606 Wilshire Blvd., Suite 100, Santa Monica, CA, 90401. Single issue price is \$1.95.

I have a note from member B.K. SHAFFER in Tyler, Texas (PH 1-849-6578) saying he finds it necessary to abandon his VP II project. He has the firewall and bulkheads cut out, longerons are cut, as are all wing ribs. He has all the materials to complete the fuselage, and he is also including the layout table. He will deliver all to the buyer. No price is quoted, but you can give him a call for further details.

So you won't forget: Take note that our NOVEMBER MEETING IS AT AIRPARK CLUBHOUSE. NOT in the usual place. You might want to come out early and take a closer look at AL BACKSTROM's WPB-1 tailless airplane, with its new paint job. Dark time comes early so you might want to brown bag it and do a little hangar snooping while it's still light.

We are shortening up this month's newsletter as time slipped up on us, but next month we'll get started with the material a little earlier. Earlier this month I spent a full week with an old friend from my hometown helping him build up a wide body T-18 fuselage and getting him going on the folding wing for it. He bought my first homebuilt in 1929 (an ALCO sport) and a couple years back he took over my Starduster Too project, covered it and did a beautiful job painting it to win the 1st Place Designer's award for the Best Starduster Too at OSH '79.

To close out this month's efforts we present a continuation of our "Dumb Things I have Did" Series (sic) by member, Jim Ward and finally, an article by Ken Morris, long time stalwart of Chapter 34 (FTW) and a current Designee of Chapter 34.

DUMB THINGS I HAVE DID

by: James Ward

In 1961, while a senior in high school, I decided to temporarily put aside playing doctor with the neighborhood girls and start work on one of my goals, which was to learn to fly. Being a typical teenager (short on money) I took the club route to flying lessons and joined an outfit located south of Grand Prairie called Texas Soaring Association. At TSA I was able to take my first dual instruction in a well worn J-3 Cub at the rate of seven dollars an hour for the machine and beer for the instructor.

My first instructor was a fellow named Lenard Pratt. He was, as I remember, about 5'6" tall, cocky, a veteran of World War II with hundreds of flying hours and at that time employed by an outfit known as "Teeter-Totter Airlines." I am almost certain they have changed the name since then, but I digress from my story.

I had had considerable exposure to light aircraft before obtaining my student ticket. As a result, after a two hour and forty-five minute checkout Pratt soloed me with the immortal, never to be forgotten words "Try not to wreck our Cub". During the next two or three weekends I racked up 3 or 4 hours, both solo and dual, and started to think of myself as a "real" aviator. Then one fateful Sunday I went flying. I shot a couple of emergency landings off the end of the field, flew around sightseeing and landed back at TSA. Pratt, beer in hand, immediately called me off behind the T-hangars. "Just what was that all about" he asked? "What?" said, I, showing my best blank look. "Well," Pratt said slowly, "we were all sitting around in front of the club house, discussing serious matters (women and

and drinking) when we heard the Cub engine quit. Looked up and there's the Cub, cocked down at this Gawd awful angle. Down you come and we stand and watch while you disappear down behind the trees! No sooner had we downed your final toast (At that time the club members were fast elbow benders and not overly optimistic about student pilot survival) then we hear the engine come back to life and see you struggle up from behind the trees. About the time we all get set down, again we hear the engine quit and down you go behind the trees again. Just what was that all about anyway?" "Well" said I, showing my best hurt look, "I was practicing emergency landings." Pratt got kind of a dark, thoughtful look on his face and said "With less than 8 hours total time, how would you tell a good one from a bad one." You could have gotten into serious trouble and not realized it until you flattened yourself into jelly on a rock. Don't ever do anything like that again without clearing it with me first!" I had to admit that after thinking on it some that he had an excellent point.

The redeeming social significance of this little story is to think two-fold. If you are anyone's student, you are taking instruction from someone who is better and more experienced than you are. The fact that the instructor has demonstrated, or perhaps allowed you, the student, to perform a maneuver under direct supervision does not automatically mean that you are qualified to do it by yourself. Discuss in detail with your instructor what you are going to do and not do during practice time. One of the worst positions you can be in is to "Don't know what you don't know."

If you are an instructor, your student's abilities and limitations are probably obvious to you. A student's limitations may not be nearly as obvious to the student. Discuss early, and in great detail, what your student may and may not do when flying solo.

* * * * *

And, now the article by Ken Morris:

BUYING A USED AIRCRAFT ENGINE

by: Ken Morris

How many times have you heard this, "Two hundred hours since major overhaul, logs lost"? Or, "Removed from a wind damaged airplane."? Of course it could be a good engine but the odds far in favor of a pile of junk. There are many concepts on buying a used engine. No doubt you have heard, "Its going into an experimental and does not have to be certified", or "I'll overhaul it the first chance". Lets be reasonable now, the last thing one should worry about in an experimental is whether the engine will keep turning.

Here are some examples. I bought a Cont 65 and intended to convert it to an A-75 or A-80 for the Miniplane just completed (N34QB is the one that PETE OHLSON started in about 1960!). The engine was removed for a T-craft that was clipped and converted to 150 HP and the log showed a midlin overhaul 200 hours ago. Yep, on teardown inspection: case was cracked, crank was cracked, one cylinder head cracked, one jug worn past regrind limits - to name a few items. Oh well, the mags and carb were worth about what I paid for the pile. But suppose the engine had been installed without a teardown and look see? Solution = buy enough parts to go with some misc stuff on hand and build up a C-85 to new tolerances.

Heres another: A good friend bought a very nice looking Cessna 175 with "400 hours since major". He soon found that it burned a quart of oil an hour. You guessed it, no info on what the overhaul consisted of, no yellow tags. He pulled the jugs and found five of the

six worn past regrind or chrome limits. He converted to 180 HP with CS prop and came out with a very nice airplane but at considerable more cost than intended.

Chapter 34 and 168 members who have been around for a few years will remember a young lad up north of the metroplex a ways who built a neat two seater then later installed a larger engine. Seems like he had a Cont 65 and went to a Lyc 108 or 125. Anyway the engine was installed "as is" and flew the bird nicely - for awhile. But then one day it quit on take off and splashed both him and the airplane.

Those who get the EAA Designee Newsletter have surely noted that a high percentage of accident reports result from engine failure, a good many on first flight. Unfortunately the newsletter never gives much detail so we never know if it was actual engine failure or fuel system or whatever. Old Spareparts quit on me once but fortunately this old granny type had circled the patch a couple of times for altitude before going out for some aerobatics and was able to get back to Russell International even if it was down wind. After considerable trouble shooting it turned out to be a vapor lock in the fuel line - had just hooked up the foot warmer for winter and the overboard hot air was too close to the fuel line! There are lots of little dumb things we can unknowingly build into an experimental.

One Chapter 34 member, a long time A&P, tells a story that he once bought a slick Culver Cadet real cheap because the owner never could get the engine to run right. He took the engine apart and found three different kinds of pistons! I once bargained for a C-85-12 that had supposedly been removed from a wind damaged Luscombe, but first got an agreement that I might have a good look at it (no logs). First step was a dial gage to the prop flange - it wobbled about three times the limit (wind damage, surre), next a jug was removed and inside was some mass of corrosion (an engine will start to rust inside in about two weeks if it has not been preserved). Since I did not own a boat and had no use for a good anchor — ...

Don't buy a used aircraft engine just because it looks good and the sales pitch sounds good. The best buy is a remanufactured or overhauled engine done by a reputable firm or by a mechanic you know and trust. Some individuals do as good a work as do the larger outfits - but then there are others. Perhaps the most economical route is to buy a FIRST RUN runout and overhaul it yourself or have a trusted mechanic overhaul it. Then you will KNOW what you have. If you do it yourself never start without the appropriate manuals. A current manual costs less than ten bucks and is most essential.

An overhaul is an overhaul - don't you believe it. A "Top overhaul" means ONLY the cylinders were reworked, NOT the crank, main bearings, cam/lifters, accessories, etc. Some major overhauls do not include the accessories. Carburetors, magnetos, fuel pumps, generators and starters wear out and go kaput too, so all these should be renewed at the time the basic engine is done. Last but not least is an overhaul vs. remanufacture. There is considerably difference of opinions as to the terminology but the main thing is whether the engine is overhauled/rebuilt (call it what you like) to NEW tolerances or to SERVICEABLE limits. Of course an engine rebuilt to new tolerances should last to TBO hours. It will cost more but many times will pay off in the long run. One done up to service limits already has wear in the moving parts. It will provide good service if in fact the service limits were observed but will not last as long as one built to new limits.

In summary, buying a used airplane engine is about like buying one of Honest Johns used cars, a considerable gamble at best. But the consequences of losing on a used airplane engine are far worse.

* * * * *

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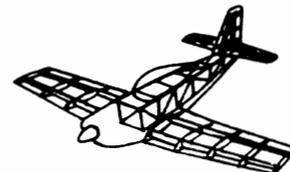
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