ACRO SPORT Newsletter

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Paul Poberezny Editorial

The homebuilt movement certainly has grown and seen great success throughout the world. There are many who have the desire to work with hand and mind, to be creative, and to self educate. It is often quite a challenge for some to take a set of plans, review them over and over, and ask questions of others who have gone through the same learning experience.

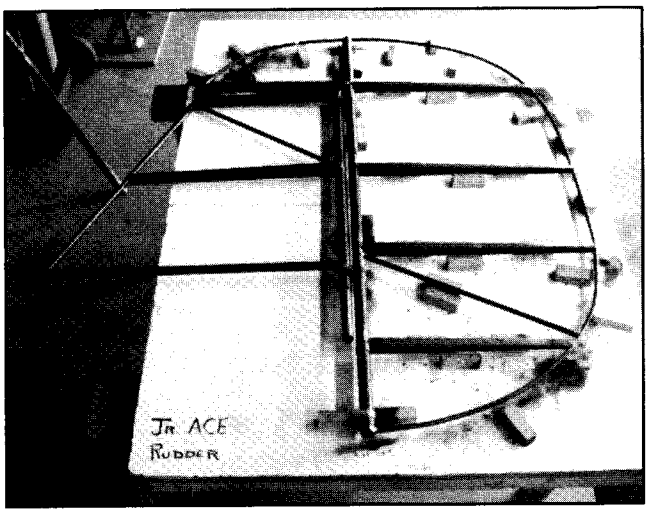
I can well remember when I built up my first clipped wing Taylorcraft back in 1948. Modifying a 1938, 40 hp Taylorcraft was a challenge to me back then. I doubled the wing ribs, shortened the ailerons (which I found was a mistake), cut down the tailgroup, and faired in the stabilizer and vertical fin, much like a Monocoupe. It had a wing span of 26', powered with a fuel injected Continental C-85, swinging a metal prop. I gulled the wings in at the fuselage like a Fairchild 24 and it had a sloped windshield as well a single seat mounted on the left side.

The biggest problem that faced me was designing an inverted fuel system. I used a Luscombe fuel tank which was mounted behind the single seat (much like a moonshiners establishment). The small two gallon header tank, taken from an L-2 Taylorcraft, was mounted on the floor to supply the fuel when the airplane was upside down. An arrangement of fuel lines was "T'd" in at the fuel injector. For normal flying the supply of fuel was the gravity feeding Luscombe tank. I can recall the many nights I laid there and how many sketches were drawn to make it work, - which it finally did.

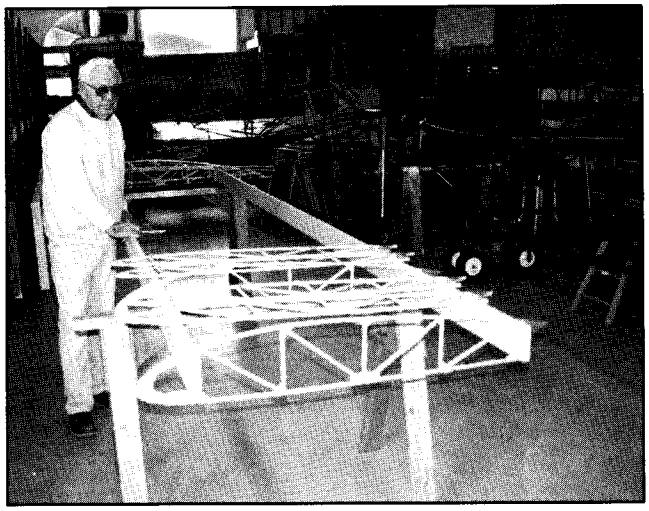
I can imagine how puzzling it can be when one gets a set of drawings for the Acro Sport, Junior Ace or Super Ace for the first time, especially if they have not been involved in airplane building. I have had people say that the Acro Sport drawings were too complicated and contained too much detail. But how does one measure the abilities or talents of an unknown person, many hundreds of miles away?

Today, with our Chapter Program, the EAA Designee Program and the many calls to our Information Services office at Headquarters for information, there is a great deal of help

In the Airplane Factory, located in the EAA campsite, Paul reviews the rudder for a Junior Ace assembled by EAA's Ford Trimotor volunteeer pilot, George Daubner, prior to Paul's final welding. On the wall is a lower left wing for a 1929 Consolidated PT-3 which volunteers rebuilt.



The Pober Junior Ace rudder fixture is shown here. The vertical fin has been put into position to ensure that the fin leading edge is aligned and there is no overlap or underlap at the junction of the rudder before final welding. The jig fixture is made of 5/8" plywood and the jig blocks are 1" x 1" square in 3" lengths. The rudder is laid out full size and blocks nailed in position on each side of the center line at a distance to keep the center of the tubing on the center line. For example, a one inch tube would call for the blocks to be positioned 1/2" on each side of the center line so that the one inch tube would be held in place.



Vic Goyke - EAA's all around electrician, Security chief and volunteer. Seen here at the Aeroplane Factory fitting some of the wing ribs that he and others built for the two Junior Aces.

out there for those with a desire to build and seeking self education.

A small group of EAA volunteers, most of whom are also volunteers at the EAA's Pioneer Airport, wanted to get involved in a building project to learn more. As a result, I sent an order off to Wicks for the tubing, spruce, etc. for two more Junior Ace projects. During the winter months we constructed all of the wing ribs for two aircraft, built up two fuselages, two tailgroups and most of the landing gear parts. Now, with Pioneer Airport alive for the summer, I find myself alone, welding away on all the minor things such as fittings, reinforcing finger straps, etc.

One of the Junior Ace's will be powered with a 117 hp factory-new Lycoming 0-235. I am uncertain as to the powerplant we will use on the second aircraft at this time. I have taken a lot of photos throughout the project that, time permitting, I could put together into a small publication that

To See or Not To See

by Bill Berrick, Editor

Attendees of the '95 Acro Sport Forum at Oshkosh were rewarded with many pearls of wisdom from Don Baker, Mike Finney, Rich Hartzel, and Paul Felkner. Don was again the moderator, and with his panel, delivered many useful tips on building, maintenance, and flying of our airplanes.

I had been flying my Acro Sport I at 75 MPH on final and doing three point landings for the four years since the first flight, (see Newsletter #44 for my reasons). At this forum, Don Baker and Mike Finney both revealed that they fly final at 90 MPH and do wheel landings in order to be able to SEE THE RUNWAY all of the way down final, and on the runway until the tail drops! What a great idea! I went out and did about ten landings as soon as I returned home, and I will have to agree that flying 90 MPH on final avoids some of the anxiety I have usually suffered over the threshold, waiting for that first glimpse of the runway edges in the corners of my eyes.

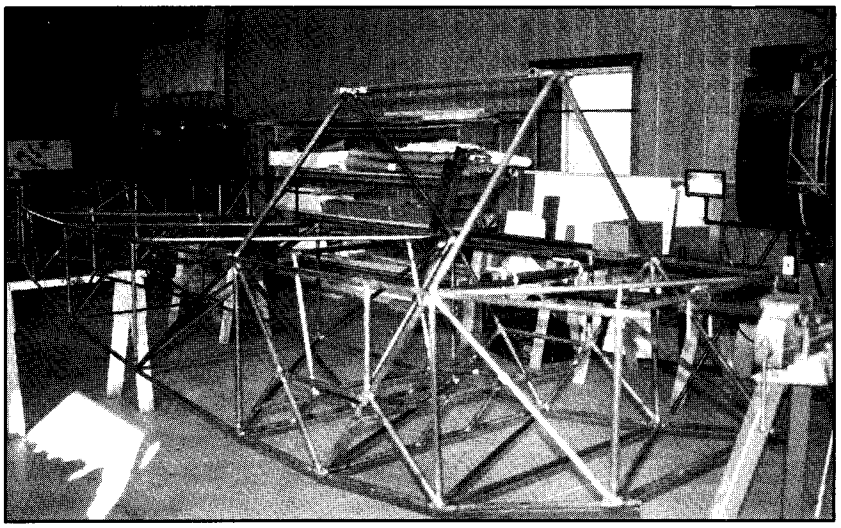
I must admit to some impressive leaps back into the air and go-arounds during some of the first seven of the ten wheel landings that day. It was difficult to make myself keep that nose down in a level attitude after touchdown; at that speed, the Acro surely wants to fly if you don't! Landings eight and nine were "greasers", and ten was "good enough". My practice was rewarded when I returned to my home base to a significant 90 degree crosswind. I made a good landing, and really enjoyed keeping the runway in sight! This is using a good bit more of the runway before turning off. I'll try to keep current on three point landings for the times when I don't have runway to spare, but I just may become a convert.

Here is a string of the pearls from the forum: 1) Spruce Specialty has the springs for the Smith miniplane type of landing gear shocks if you want to get away from bungee cords. 2) If the wood screws are no longer staying in the fairings where the top wings join the center section, try putting in helicoils and using machine screws. 3) Bulge the ends of your fuel tanks nearly one inch when pressure testing in order to prevent "oil canning" and future cracks. 4) Always clean off any traces of oil as well as the bugs after each flight; if any new oil leaks show up, you want to know about it! 5) Don's method of checking static lines — "0" the altimeter on the ground, fly and land; it should again be at "0". 6) Paul Felkner put airfoil shaped wood formers in the gear legs to stop the fabric motion in flight and prevent cracking. 7) Use 5-8 degrees trail on tailwheel post to avoid shimmey.

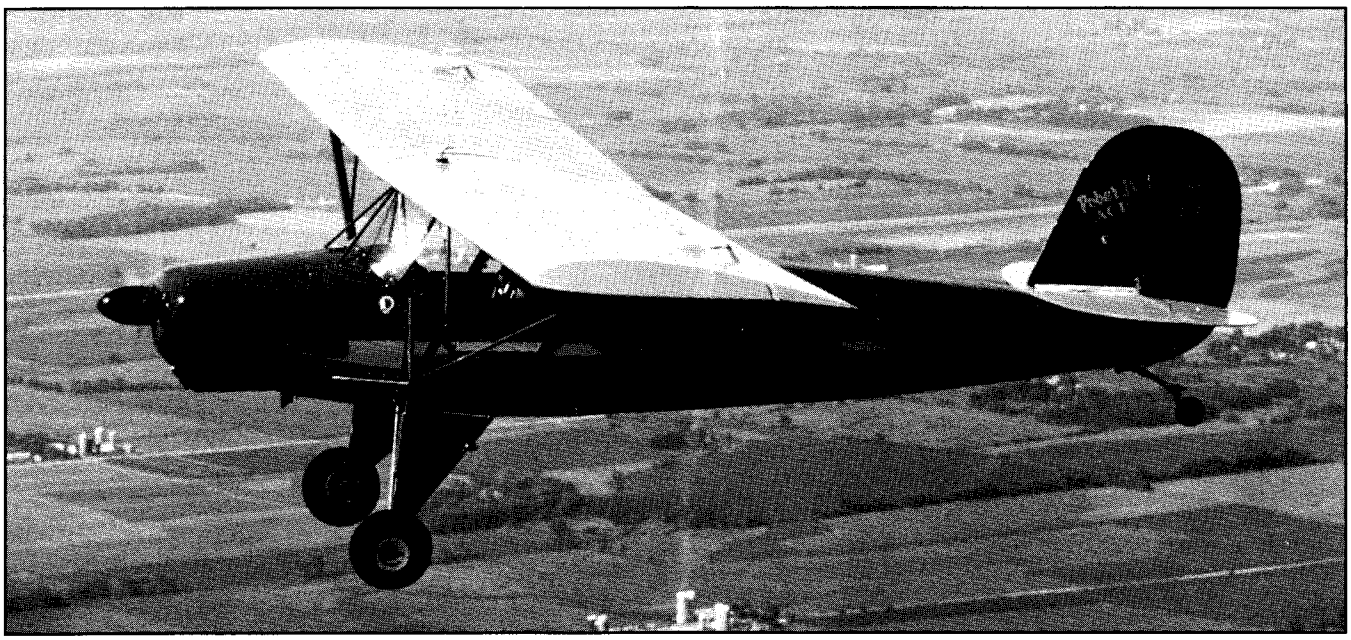
There were still more, but you get the idea of the value of these forums to all of us. Be there next year!

would be helpful to builders. As the old saying goes, "a picture is worth a thousand words".

As with all aircraft designers, the transfer of information to paper is sometimes not accurate. In going through the building process we found the need for some changes which require our good friend, Bill Blake, to come forth with additional drawings or corrections and updates. These have been sent to all Junior Ace plan holders and will accompany new drawings.

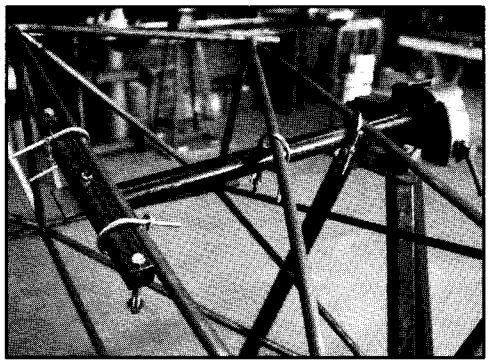


BELOW - Paul's prototype Junior Ace.



BELOW LEFT - The Pober Junior Ace fuselage during final welding. All 4130 chromoly tubing is used in construction. After hours behind the welding torch one realizes why airplanes cost so much. It is a lot more fun doing your own work as a hobby.

BELOW - For rotating the Junior Ace fuselage during welding, a simple fixture was devised. A piece of square tubing welded to a 1-3/4" pipe and inserted into a vise mounted on a stand served the purpose. A horse at the aft end of the fuselage served us well. A piece of angle iron could replace the square tubing. "U" clamps from the local hardware store held the fixture in place. The bolts shown on the square tubing were part of attachments used in turning a Curtiss Robin fuselage during covering.



Letters To The Editor

More About Propellers

Dear Bill,

I always enjoy reading the Newsletter and am currently working on an Acro II. My purpose for writing is to offer some additional information on propellers which were discussed in the most recent June 1995 Newsletter. Enclosed is a copy of an article I wrote for the July, 1994 SPORT AVIATION and two propeller Type Certificate Data Sheets.

You may be interested to know that it was the Acro newsletter that prompted me to write the article. While thumbing through an old newsletter, I came across a listing of propeller "horror stories" of failed blades, crashed airplanes and fatalities. It seemed a shame for this to be occurring when it appeared that some of the incidents could have been prevented by five minutes of research using free literature. Since propellers are what I do at work all day, I tried to explain through the article where good information on propeller applications can be found and why such information is necessary. Feel free to use any of this material you like.

Moving on — the enclosed data sheets, the McCauley sheet lists a number of fixed pitch propellers suitable for the Acro I and II powered by Lycoming O-235/290/320/360 engines. The 1C172 propeller was used on O-320 powered Citabrias for years in 72 and 74 inch diameters and should make a good prop for the Acro. Check the data sheets and application guides for details.

For builders wanting a constant speed propeller for an O-320 or O-360

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

P-910
Revision 9
McCAULEY
1C160
1C172

Feb. 22, 1985

TYPE CERTIFICATE DATA SHEET NO. P-910

Propellers of models described herein conforming with this data sheet (which is a part of propeller Type Certificate No. 910) and other approved data on file with the Federal Aviation Administration meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

The propellers are of fixed-pitch, single-piece, two blade aluminum alloy construction. These limitations apply to all propellers listed herein except as modified in the notes.

Type Certificate Holder — McCauley Accessory Division
Cessna Aircraft Company
Vandalia, Ohio 45377

Model (See NOTE 2)	Takeoff & Max. Cont. HP - RPM		Diameter	Standard Pitch	Hub Drilling No Holes	Hub Drilling Dia. Holes	Hub Drilling Dia. Bolt Circle	Diameter Pilot Hole	Hub Dimensions Dia.	Hub Dimensions Thickness	Weight (Lb.) (Max. Dia.)
1C160/CTM	160	2700	75"-68"	75"-40"	6	29/64"	4-3/4"	2-1/4"	5-9/16"	6-13/16"	35.5*
1C160/DTM	160	2700	75"-68"	75"-40"	6	29/64"	4-3/4"	2-1/4"	6-1/4"	6-13/16"	35.5*
1C160/EGM	160	2700	76"-68"	75"-40"	6	25/64"	4-3/4"	2-1/4"	6-1/4"	3-7/16"	30.5
~~1C160/FGM~~	160	2700	76"-68"	75"-40"	6	25/64"	4-3/4"	2-1/4"	5-5/8"	4-3/4"	32.0
1C160/VCM	118	2800	76"-68"	75"-40"	6	25/64"	4-3/8"	2-1/4"	5-9/16"	5-13/16"	34.5*
1C172/EM	165	2800	76"-68"	75"-38"	6	33/64"	4"	2-1/4"	4-7/8"	3-5/16"	29
~~1C172/MDM~~	165	2800	76"-68"	75"-40"	8	25/64"	5-1/4"	2-1/4"	6-1/4"	3-7/16"	30
1C172/MGM	165	2800	76"-68"	75"-40"	6	25/64"	4-3/4"	2-1/4"	6-1/4"	3-7/16"	30
1C172/MFA	180	2700	75"-68"	75"-40"	6	33/64"	4-3/4"	2-1/4"	5-3/4"	3-7/16"	30
~~1C172/AGM~~	165	2800	76"-68"	75"-40"	6	25/64"	4-3/4"	2-1/4"	6-1/4"	5-7/16"	34.5
1C172/TM	160	2700	76"-68"	75"-40"	6	29/64"	4-3/4"	2-1/4"	5-63/64"	4-13/16"	31.2
1C172/MTM	160	2700	76"-68"	75"-40"	6	29/64"	4-3/4"	2-1/4"	5-63/64"	6-13/16"	35.2*
1C172/BTM	160	2700	74"-68"	75"-40"	6	29/64"	4-3/4"	2-1/4"	5-9/16"	5-31/32"	33.3*
1C172/SBTM	160	2700	74"-68"	75"-40"	6	29/64"	4-3/4"	2-1/4"	5-9/16"	5-31/32"	45.0*

*Weight includes integral doweled spacer, but not installation bolts.

Certification basis

Models 1C172/EM, 1C172/MDM, and 1C172/MGM:
Civil Air Regulations Part 14, effective December 14, 1956.
Model 1C172/MFA:
Civil Air Regulations Part 14, effective December 15, 1956, with Amendment 14-1 thereto.
Models 1C172/AGM and 1C172/TM:
Federal Aviation Regulations, Part 35 with Amendment 35-1 thereto.
All other models:
Federal Aviation Regulations, Part 35 with Amendments 35-1 and 35-2 thereto.
Type Certificate No. 910 issued May 12, 1959. Model 1C172/MFA was approved October 25, 1963, under delegation option provisions of the Regulations of the Administrator Part 410. The following models were approved under the Delegation Option Authorization provisions of Federal Aviation Regulations Part 21, Subpart J:
1C172/AGM approved May 3, 1965
1C172/TM approved January 20, 1967
1C172/MTM approved October 13, 1967
*1C172/CGM approved December 12, 1969
1C160/CTM approved December 1, 1970
1C172/BTM approved March 12, 1971
1C172/SBTM approved December 6, 1971
1C160/EGM approved May 11, 1973
1C160/DTM approved April 16, 1973
1C160/FGM approved August 24, 1973
1C160/VCM approved January 22, 1985

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*Approval of Model 1C172.CGM was terminated August 11, 1970, at the manufacturer's request. All propellers of this model were converted by the manufacturer to other approved models.
Date of Application for Type Certificate - May 6, 1959.

Production basis — Production Certificate No. 3

NOTE 1. Installation.

For Installation on flanged propeller shaft ends. The front plate supplied by engine manufacturer is not to be used. Install with special alloy steel bolts specified or furnished by McCauley.

Model 1C172/EM is for use on special Continental Motors Corp. flanged propeller shaft and must be installed in accordance with McCauley Dwg. C-2378.

Model 1C172/MDM is for use on SAE No. 3 propeller flange and must be installed in accordance with McCauley Dwg. C-1177.

Model 1C172/MGM is for use on SAE No. 2 flange and must be installed in accordance with McCauley Dwg. C-1968.

Model 1C172/MFA is for use on SAE No. 2 modified flange with (6) 1/2" mounting bolts and must be installed in accordance with McCauley Drawing C-3343.

Model 1C172/AGM is for use on SAE No. 2 flange with McCauley P/N B-3515 spacer and must be installed in accordance with McCauley Dwg. C-3518.

Model 1C172/TM is for use on SAE No. 2 modified flange with (6) 7/16" mounting bolts and McCauley P/N B-3821 spacer and must be installed in accordance with McCauley Drawing C-3824.

Model 1C172/MTM is for use on SAE No. 2 modified flange with (6) 7/16" mounting bolts and McCauley P/N B-3898 spacer and must be installed in accordance with McCauley Drawing C-3900.

Model 1C160/CTM is for use on SAE No. 2 modified flange with (6) 7/16" mounting bolts and McCauley P/N C-3898 spacer and must be installed in accordance with McCauley Drawing C-3900.

Model 1C172/BTM is for use on SAE No. 2 modified flange with (6) 7/16" mounting bolts and McCauley P/N B-4381 spacer and must be installed in accordance with McCauley Drawing C-4382.

Model 1C172/SBTM is for use on SAE No. 2 modified flange with (6) 7/16" mounting bolts and McCauley P/N B-4425 steel spacer and must be installed in accordance with McCauley Drawing C-4382.

Model 1C160/EGM is for use on SAE No. 2 flange and must be installed in accordance with McCauley Dwg. C-1968.

Model 1C160/FGM is for use on SAE No. 2 flange with McCauley P/N B-4561 spacer and must be installed in accordance with McCauley Drawing C-4563.

Model 1C160/DTM is for use on SAE No. 2 modified flange with (6) 7/16" mounting bolts and C-4516 spacer and must be installed in accordance with McCauley Drawing C-4518.

Model 1C160/VCM is for use on SAE No. 1 flange with (6) 3/8" mounting bolts and McCauley P/N B-5535 spacer and must be installed in accordance with McCauley Drawing C-5537.

powered airplane, the Hartzell HC-C2Y series propellers might be a good bet since this propeller has been used for years on the Pitts S2A. Again, check the airplane and propeller data sheets for details, (diameter limits, angles, placards, etc.). The best bet when you find a bargain is to check the application guides and data sheets before you buy it.

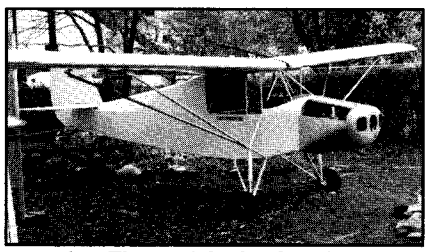
In closing, one of the biggest misconceptions I have run across involves propeller data sheets. Many people, (even some prop shops), assume that because the diameter is between the values shown for basic approval, (first page of the data sheet), that the propeller is O.K. to fly. This is not true. It must also have vibration approval on a specific engine at a specific diameter. Many, (but not necessarily all), of the approved engine/propeller combinations are listed under Note 9 at the back of the sheet. Hope you find this information useful.

Best regards,
Brian E. Meyer
2585 Seneca Dr.
Troy, OH 45373

Dear LaFonda Jean,

I received the invitation to help with the Acro forum at Oshkosh '95. Thank you for the thought. This won't be the year for me at Oshkosh due to conflicts with work schedules.

My plane will be done late this season, and I hope to fly it to the conven-



Lee Thomas' Junior Ace due at Oshkosh in '96

tion next year, at which time I would be glad to help out.

The photo is from the day we set the wing in place, using fence posts for temporary wing struts.

Sincerely,
Lee H. Thomas

Dear Bill:

I received a call from Joe Dory recently. His address is 609 N. Almon Street, Trailer 3052, Moscow, ID 83842-9739. Joe has an Acro Sport I that had some flutter on the slave strut interconnecting the ailerons. This occurred at 110-120 MPH near cruise, and only happened in uncoordinated flight. He slips the aircraft, then it goes away. To correct this, he taped a welding rod on the offending interconnect strut, just on

NOTE 2. Propeller Model Designation. The propeller model designation consists of a series of numbers suffixed to the basic design number to indicate propeller diameter and geometric pitch at .75 radius.

1C172 / EM 76 54

- 1C172 — Basic Design No.
- / — Suffix
- 76 — Diameter in inches
- 54 — Pitch at .75R in inches
- EM — Denotes special Flange 4" B.C.
  MDM - Denotes SAE No. 3 Flange
  MGM, AGM, EGM, FGM - Denote SAE No. 2 Flange
  MFA - Denotes SAE No. 2 Flange Modified (6-1/2" Mounting Bolts)
  TM, MTM, CTM, BTM, SBTM, - Denote SAE No. 2 Flange (6-7/16" Mounting Bolts)
  VCM - Denotes SAE No. 1 Flange (6-3/8" Mounting Bolts)

NOTES 3, 4, 5, 6. Not applicable.

NOTE 7. Accessories.
(a) Spinners.
(1) Model 1C172/MFA eligible with McCauley spinner; reference D-3337 Shell, D-3338 Bulkhead, and D-3339 Installation.

NOTE 8. Not applicable.

NOTE 9. Table of Propeller-Engine Combinations
Approved Vibrationwise for Use on Normal Category Single-Engine Tractor Aircraft

The maximum and minimum propeller diameters that can be used from a vibration standpoint are shown below. No reduction below the minimum diameter listed is permissible since this figure includes the diameter reduction allowable for repair purposes.

Propeller Model	Engine Model	Max. Dia. (Inches)	Min. Dia. (Inches)	Placards
1C172/EM 1C172/MDM	Continental C-145 Series and Continental O-300 Series up to 145 hp. and 2700 r.p.m.	76	70	None
1C172/MGM	Lycoming O-235 Series up to 125 hp. and 2800 r.p.m.	74	73	"Avoid continuous operation above 75% power in cruise."
		73	72	None
		72	71	"Avoid continuous operation while descending between 2125 and 2375 r.p.m. with power retarded below one quarter throttle setting."
		71	70	"Avoid continuous operation while descending between 2150 and 2450 r.p.m. with power retarded below one quarter throttle setting."
1C172/MGM 1C172/AGM	Lycoming O-290 Series up to 135 hp. and 2600 r.p.m.	76	70	None
1C160/EGM	Lycoming O-320 Series up to 150 hp. and 2700 r.p.m.	76	73	None
1C160/FGM	Lycoming O-320 Series up to 150 hp. and 2700 r.p.m.	76	74	None
1C160/CTM 1C160/DTM	Lycoming O-320 and IO-320 Series up to 150 hp. and 2700 r.p.m.	75	74	None
1C172/MGM 1C172/AGM 1C172/TM	Lycoming O-320 and IO-320 Series up to 160 hp. and 2700 r.p.m.	76	70	None
1C172/MTM		76	74	"Avoid continuous operation above 2500 r.p.m. in full throttle climb and above 75% power in cruise."
1C172/MTM		74	70	None
1C160/FGM	Lycoming O-320 Series up to 160 hp. and 2700 r.p.m. *pitch limited to 53" min, 59" max.	76	75	None*
	*pitch limited to 49" min, 59" max.	75	74	None*
1C172/BTM 1C172/SBTM	Lycoming O-320 and IO-320 Series up to 160 hp. and 2700 r.p.m.	74	70	None
1C160/CTM 1C160/DTM	Lycoming O-320 and IO-320 Series up to 160 hp. and 2700 r.p.m. *No placard required in airplane installation having full throttle static rpm limited to 2280 to 2400. Vc not over 128 KIAS and VNE not over 160 KIAS; otherwise placard, "Avoid continuous operation between 1950 and 2250 rpm with power retarded below 12-1/2% throttle setting" is required.	75	74	*
1C172/MFA	Lycoming O-360 Series up to 180 hp. and 2700 r.p.m.	75	74	None
1C172/EM	Rolls Royce O-240 Series up to 130 hp. and 2600 r.p.m.	76	73	"Avoid continuous operation above 75% power in cruise."
		73	72	None
		72	71	"Avoid continuous operation while descending between 2125 and 2375 r.p.m. with power retarded below one quarter throttle setting."
		71	70	"Avoid continuous operation while descending between 2150 and 2450 r.p.m. with power retarded below one quarter throttle setting."

NOTE 10. The word "eligible" as used herein does not signify approval. For approval, compliance with the applicable aircraft airworthiness requirements is required.

the left side; and this made it stop. It only occurred at the end of a roll; it takes place more often in a slip to the right than one to the left. Each side would start, but would stop when the other side did. The taped on welding rod corrected it, if anyone has a similar problem.

My best personal regards to you.

Ben Owen

Ole Erik Strande
Stavivein 2C
1313 Voyenga
Norway

Dear Ole:

Thank you very much for the telephone call. The Heim Uniball bearings can always be used in place of the normal bearings used on Acro Sport and other aircraft. The Heim Uniball is a cheaper bearing and has a slightly greater angular throw, but its strength is at least equal to that of the bearings called out on the plans. For instance, we went to the Heim F35-14 on the number 1 push tube to get the proper amount of angular clearance due to the aileron rolling from side to side, that is a necessity on that particular tube. These would replace the normal REB-3N2s: of course they are less expensive and almost as friction free.

As far as the sight gauge, the tube we found was 1/2" OD and 1/4" ID clear tube, and where we located it was the auto parts supply store. It does take a little exchanging of fittings to get the proper fittings on this. If you cannot find the appropriate size fitting in aviation, you can probably find them in the marine field which traditionally uses hose clamps to ensure that the hose stays on. This will be quite satisfactory, as there is no pressure in the sight gauge.

As far as the drag/anti-drag wire in the wing goes, it can be replaced with either 4130 rod or stainless steel rod. You must use at least 1/4" size to get a proper thread on the ends of these rods that can be cut on using a die with a guide. Either you can purchase a die with a centering guide so that the threads do not wander from side to side, or you can use a piece of hardwood hose clamped to the dye handle with the 1/4" hole drilled in it so that it will center the rod exactly on the threads. This method has been used on the Pitts and other aircraft for quite some time. To replace the 10/32"-.190 diameter known as the AN703 AC, use 1/4" rod. To replace the 1/4"-2/8" .250" diameter AN704 AC, use 5/16" rod. When using a brass jawed vice, you can squeeze the flat on the rod and use a wooden "wrench" with a slot cut in it the exact diameter of the flats on the rod to hold the rod steady when tightening the nut on it. The usual suppliers of the made-

up drag/anti-drag rods would be MacWhyte Aircraft Cable of Racine, WI. However, you can buy these rods much cheaper through a supply source, Nick D'Apuzzo, P.O. Box 174, Ambler, PA 19002, Fax 215/646-8122. The only other manufacturer that I am aware of is Bruntons in Musselburgh, EH21-7UG, Scotland, Tel. 031-665-3888, Fax 031-665-0486.

For wheel fairings, you might try Claus Savier c/o Light Speed, P.O. Box 549, Santa Paula, CA 93061 or WagAero, Inc., P.O. Box 181, Lyons, WI 53184, Tel 414/763-9586.

Good Luck to you with your project.

Sincerely,
Ben Owen
Executive Director
EAA Information Services

Oshkosh Winners!

Steve Manweiler and his new Acro Sport II, N94SM, won a Bronze Lindy award, as did Don Baker for his Acro II, N122DB. At the Acro Sport Monday evening dinner, Steve Manweiler also received the Outstanding Acro Sport Award! John Leitis and Don Baker received Service Awards, and Paul Felkner the Designer Award. The attendees at the dinner all felt honored to meet Lloyd Shepard, a guest from Australia.

A rising tide of interest in the Pober Junior Ace was in evidence at the Tuesday Forum. The forum was conducted by John Leitis with fellow Pixie builder Hart Jewell, and Super Ace builder J.J. Tomlinson. I enjoyed seeing my old school mate, Hart Jewell briefly on Sunday, but missed this forum by wearing myself out in Monday's heat and activity.

Summary of Joe Spencer's Problem with Drag/Antidrag Blocks

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Joe built his Acro Sport II in seven years, with completion and appearance at Oshkosh in 1990. It has a Lycoming 0 360 A1A engine and has done a good deal of aerobatics in about 300 hours of flight.

He was flying aerobatics and had just completed a five or six turn spin when he noticed that the aircraft was slightly out of rig. Apparently the lower wing had swept back and the slave strut between ailerons had pulled the upper aileron about 1 1/4" above the trailing edge of the wing in normal flight! As he flew along, he noted that the rig seemed to somewhat right itself, and when he landed, it almost moved back all of the way. Due to his concern about the condition of the wing, in particular the wrinkling of the leading edge in the inboard bays, he uncovered the lower wings.

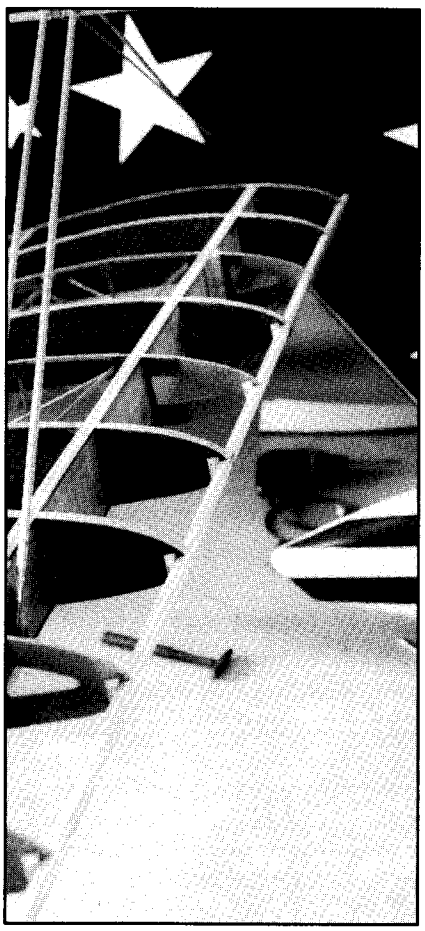
What he found was that the drag wires had pulled the blocks loose on the first two right inboard bays, and the rib had moved inboard about 1/4". Apparently the anti-drag wires had loosened up to allow the right wing to sweep back. The glue lines had failed and the blocks had split, (spruce blocks faced with 1/8" birch plywood). The wing attach bolt holes on the lower wings had somewhat elongated and were repaired by replacing the bolts with a larger size with the holes reamed to fit.

As to probable cause, there are several possibilities. It could be that the glue was improperly mixed. When mixing T-88, you should mix it according to instructions until the streaks are gone. Experienced builders say that they continue mixing it, as much as they have mixed it up to that point.

The aircraft had some rare excursions up to 200 MPH indicated airspeed. (The redline of this airplane is generally considered to be about 180 MPH). About 5 1/2 G is the max load the airplane has seen. The plywood wing walk was only installed on the left side; the design calls for it on both sides, serving as a strengthening member to that particular section on the lower wing, as well as a place to step.

Joe is replacing all of the drag and antidrag pull blocks except those in the tips with hard maple, end grain out to the washer, full height top to bottom of the spar to give more gluing area. Hale

Outstanding Acro Sport Award Winner, Steve Manweiler



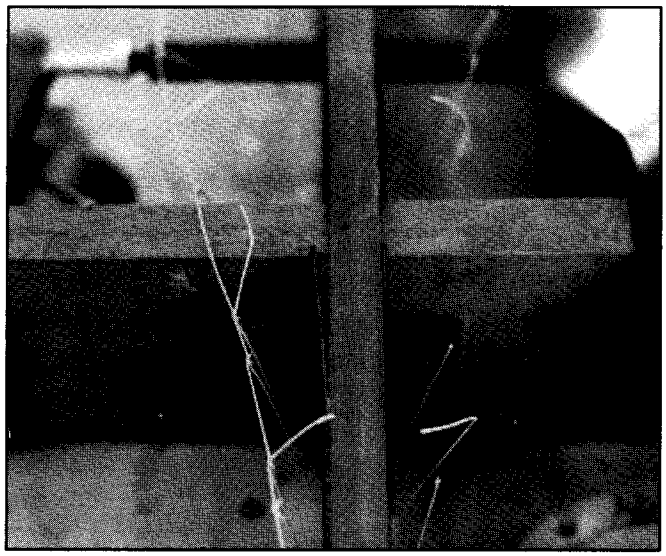
Preparation for plywood leading edge.

Wallace of the Steen Aero Lab says he always uses maple blocks and drills a shallow series of 1/8" holes on the contact surfaces to provide better attachment for the epoxy glue. Joe is also boxing in the "I" strut rib bay, top and bottom, with 1/8" birch plywood, and is putting 1/16" plywood on the leading edges.

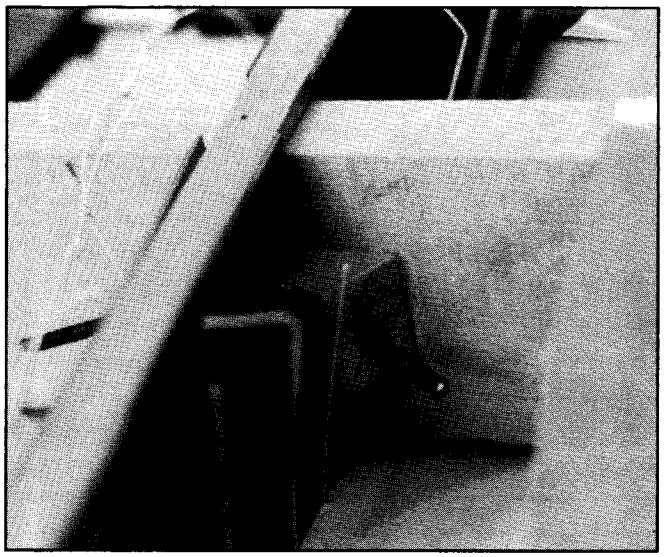
Charlie Vick, of the Forest products Lab in Madison, WI suggests use of FPL-16 glue which they have tested; they have not tested T-88. Although T-88 will dry in colder temperatures, maintaining 70 degrees F. plus will result in stronger joints.

Joe used Red Devil varnish on the wing wood, but found severe corrosion of the bolt heads in the wing with no internal deterioration of the bolts.

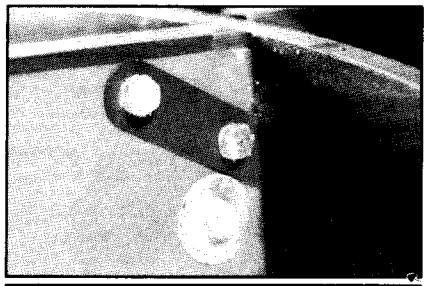
One nice thing about this method of construction is that you usually get advance notice when problems are developing!

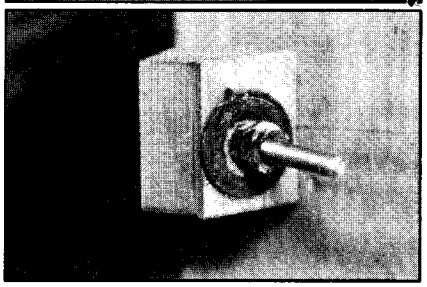


Joe Spencer's slipped drag block and rib.

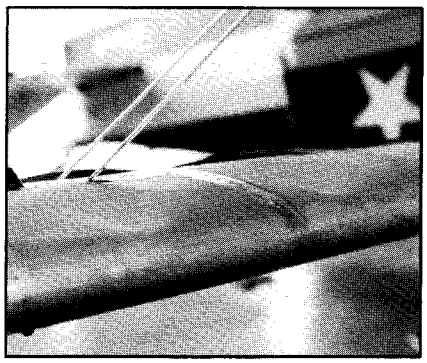


Right wing rear spar #1 drag block - note rib vertically separated and moved left.





TOP - Corrosion of bolt heads from Red Devil varnish?
BOTTOM - No varnish applied to hardware.



Note leading edge buckling.

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