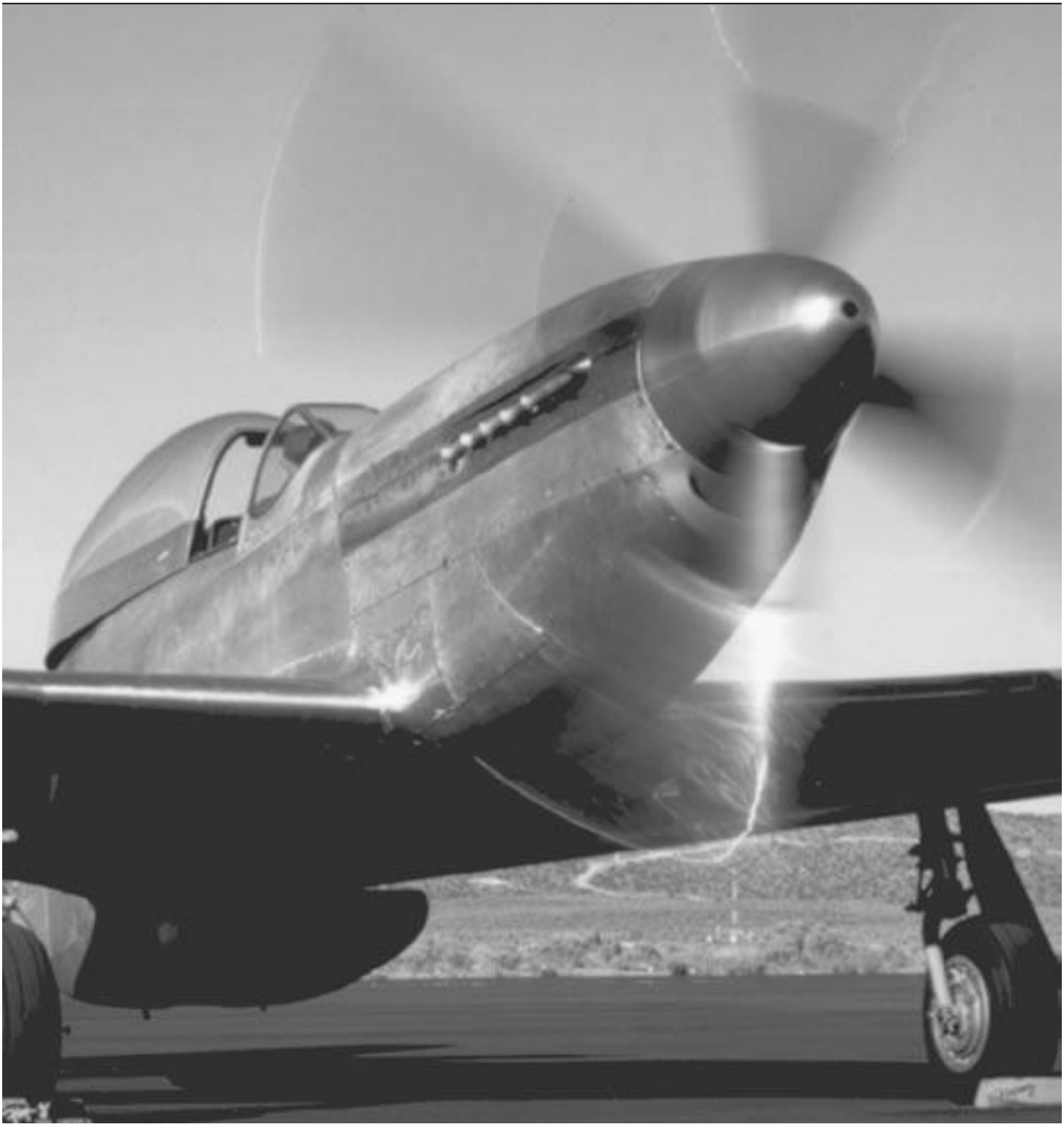
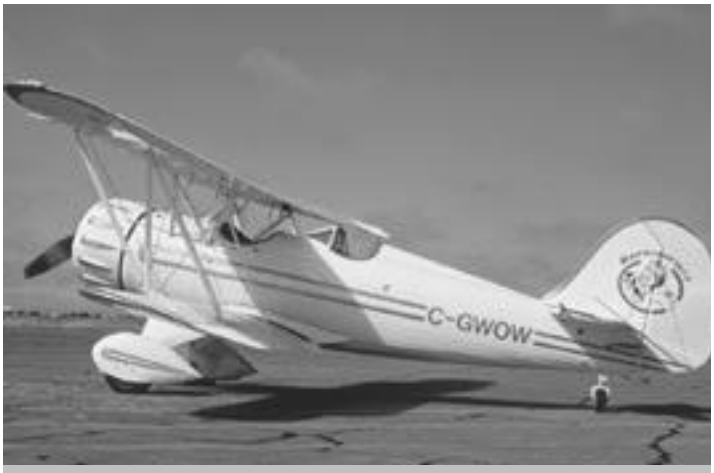
Turn & Bank

OFFICIAL NEWSLETTER OF RAAC CHAPTER 85 May 2003





On The Cover:
A P-51 struts its stuff at Reno. Mark Munzel picture.
Above: remember this Waco? It was local about 10 years ago and cost a quarter of million then. Mark Munzel pic.

inside

The TURN AND BANK is the monthly publication of RAAC Chapter 85 and is intended to keep members informed as to the club's activities, and to promote safety and technical excellence in the field of sport aviation. No responsibility or liability is assumed, expressed or implied as to the content of articles contained in the Turn and Bank: the intention is to provide a forum for discussion and exchange of ideas.
Newsletter contributions should be mailed to George Gregory, 19470-88th Avenue, Surrey, B.C. V4N 3G5 no later than the 12th of each month. Business Fax is (604)-469-3495. Please remember to indicate "attention George Gregory" on your fax. George's email address is:
gregdesign@telus.net
Enquiries to the Membership Chairman should be mailed to Rob Prior, 3032 Carina Place, Burnaby, B.C. V3J 1B5

For inspections of Amateur Built Aircraft Projects contact the MDRA Inspection Services , ph. 1-877-419-2111
fax 1-519-457-0980 email: mdrainsp@on.aibn.com
Regular Meetings are held on the first Tues. of each month at 20:00 (8pm) in the clubhouse:
Delta Airpark, 4103-104th Street Delta, B.C. Clubhouse phone: 596-3644
Mailing Address: Chapter 85, RAAC
c/o Delta Heritage Airpark, 4103-104th St., RR#3, Delta, B.C. V4K-3N3
Executive meetings are on the third Tues. of each month at 19:30 (7:30 pm) in the clubhouse.
Chapter aircraft pilots, mail cheques (Payable to RAAC Chapter 85) to:
Tedd McHenry
RAAC National Homepage: http://www.raa.ca
RAA Chapter 85 Homepage: http://www.b4.ca/raa_85
Delta Heritage Air Park Homepage: http://home.istar.ca/~bb4
Source for CARS and Chapter 549 Airworthiness Manual: http://www.aerotraining.com

RECREATIONAL AIRCRAFT ASSOCIATION CANADA
Delta Heritage Airpark
Vancouver, B.C.

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Aluminum	George Worden	433-5564
Computers in Aviation	Rob Prior	422-8446
General	Paul Trudel	532-8570

Technical Guy

Chuck Jersch

At a recent meeting I had a discussion with someone regarding torque and horsepower. Having promised George that I would do an article for him, I thought that this might be an appropriate topic.

The formula for horse power that is usually quoted is:

Horsepower = RPM x torque (in ft lbs) /5252.27
By the same token:
Torque = horsepower x 5252.27 / RPM

Some of you may be wondering where the factor 5252.27 comes from. Back in the mid eighteen hundreds James Watt, who invented the first practical steam engine, found that the power claims that various manufactures used, varied wildly. He decided that a standard should be set for power output.

Watt determined that an average horse in good physical condition could move 550 pounds one foot in one second or 60 feet in one minute. 60 x 550 gives us 33000 pounds one foot in one minute.

Since then, all motors - steam, electric, gasoline or diesel are rated in James Watt's horsepower. Kilowatts have nothing to do with James Watt, but one kilowatt equals 1.33 horsepower. Torque is almost always measured in foot lbs, although it can be measured in inch pounds or Newton meters.

In a recent Car and Driver, it details a Corvette with 520 ft lbs or torque at 4700 RPM. Looking at an end view of the motor you could picture a nut on the end of the crankshaft with a socket and a torque wrench one foot long. This motor can apply 520 pounds of pressure on the torque wrench one foot from the center, hence foot-pounds. Now picture instead of the torque wrench, a pulley or drum with a radius of one foot. This motor can rotate the drum with a load of 520 pounds and at a speed of 4700 RPM, The drums circumference is 2 x pi x r or 2 x 3.1416 x 1 = 6.283 feet per revolution. 4700 rpm x 6.283 = 29530.1 ft per minute x 520 ft lbs = 15,355,652 ft lbs divided by 33,000 = 465.32 horse-power.

To simplify things we can divide 33000 by 6.283 we get that 5252.27 factor in the original formula.

The Corvette motor is also rated at 500 hp and 5700 RPM. Using our formula, 500 hp x 5252.27 divided by 5700 = 460.7 ft lbs or torque.

How about a Dodge Viper aluminum block V10 for you Spitfire and Mustang builders. It pushes out 520 hp and 5600 RPM and 540 ft lbs torque and 4600 RPM

520 hp x 5252.27 / 5600 = 487.7 ft lbs torque at max hp
4600 RPM x 540 / 5252.27 = 472 horse power at max torque

Put a PSRU on it and gear it down about 2-1, run it at a redline of 4000 to 4500 RPM, you would have a real power house. Torque would double to 1080 ft lbs at 4600 RPM, but only 2300 RPM prop speed. Horse power would remain at 472 HP. You might want to do a little calculation on your propeller tip speed to make sure it is not doing too much damage to the sound barrier.

Another example, the Volkswagen diesel rated at 90 hp @ 3750 RPM and 155 ft lbs torque and 1900 RPM

Torque @ 3750 RPM = 90 x 5252.27 / 3750 = 126 ft lbs.
Horsepower @ 1900 RPM = 1900 x 155 / 5252.27 = 56 HP

This motor is redlined at 4600 RPM, however if its maximum HP is rated at 3750 RPM it is an indication that torque drops off quite quickly above 3750 RPM. It could be an ideal choice for a direct drive prop.

I am not too familiar with the VW TDI but the older 1600 cc turbocharged diesels were the same approximate weight as the gas motor and were said to be good for about 500,000 miles. I've read claims that the TDI is good for a million miles.

How would you like to pull up to the pumps and ask to have your 'flutter-bug' filled with Jet A?

By the way, a two to one reduction is not a good idea as every harmonic will be magnified and can have disastrous results. Choose numbers like 1.89 to 1 or 2.13 to one. Belts are more forgiving in this regard than chains or gears, but that's another story.

Bulletin Board

Last I heard, Norm Helmer is looking for someone to help or take over his Paradyne project. The Paradyne is a cutting edge new concept in STOL aircraft that shows promise. He's now residing at the George Kerby Centre in Burnaby. His phone number is (604) 527-8970.

Dan Lawler would like you to send your email addresses to him at:

dan.lawler@kvaerner.com

He will create a database so he can send announcements about meeting programs, etc. Currently he has a list of about 20 e-mail addresses, and would like to expand it and keep it up to date.

Dan has suffered a stroke and is recovering at the G.F. Strong facility in Vancouver.

Want to learn more about aircraft construction? Want to contribute to the community good? Get involved in the J-5 project! Also, we are looking for help from someone knowlegable in fabric work. Talk to a member of the executive and they'll put you in contact with the right people.

George is looking for pictures you may have of aircraft for his Stock picture collection. These will be used in future issues of the Turn and Bank as needed as well as use in the Recreational Flyer when a nice picture is needed for articles and fillers. And it goes without saying that I'm always looking for good articles for the newsletter.

And speaking of Arlington, the EAA NorthWest Fly-In begins July 9, and runs throught to Sunday, July 13. Maybe there'll be a Tailwind there this year...

Talk to Me!
Inform your editor of upcoming events George 604-882-8016

Minutes
Jim Hunter

Minutes of the General Meeting, 1 April, 2003
Call to order: 8:00 pm by President Tim Baker
Hunter/Meyer: that the Minutes of the General Meeting of 4 March, 2003 be adopted as printed in the Turn and Bank. Discussion Carried.
Correspondence: None.
Committee Reports:
Treasury: Don Souter. Verbal report by Don.
Membership: Rob Prior: 137 total of whom 28 are complimentary. We are down about 15 from last year's peak.
Buildings: David Bell. Looks like our water heater may be clappers. Will look at it.
Library: John Macready: OK Many thanx Eric Munzer for the laptop and for the cabinets for library storage.
Vice President: Gerrard Van Dijk: All ready for the Annual Bash, April 5.
Newsletter: George Gregory: The usual he says.
Program: Dan Lawler still not recovered from his unfortunate illnes. Don Souter to try and have the DOT and Accident Investigation folk to do a presentation next month. Watch for announcements.
Aircraft: Ted McHenry: 3.1 hours on the Turbi last month. On the J-5: Squad has started rib stitching and need volunteers to learn this essential intricacy.
Good member Francois Leh has returned to his former job as a Chapter Check Pilot. Contact Francois at (604) 813-7742 if you are due for a ninety day check ride or a new check out.
Airpark Committee (DHAPCOM) Terry Wilshire: 1) Breakfast, Sunday 13 April. 2) DHAPCOM meets 24 April. 3) Need more volunteers for miriad of jobs around the field. See Terry. 4) Lots of Parks folk visiting. Good PR.
Old Business: none.
New Business:
Hunter/Prior #1: that the Chapter donate the sum of $500 to the Bursary Fund for the Aircraft maintenance Engineer Program at BCIT. Discussion Carried. Note: This will now be the forth year that the Chapter has made this donation.
Announcement: for a discription of the rather maniac destruction of Meigs Field airport at Chicago, go to Chicago Tribune.com.
Meyer/Prior #2: that we adjourn and blowed if we didn't.

Jim Hunter, Secretary.

The Chapter's second aircraft carrier trailer is for sale. It's a gem! $480 or best reasonable offer. It's at John Keon's place 16301 - 20 Ave., Surrey ph. 536-8589 or call Jim Hunter at 576-2678.

Sentimental Journey For A Canadian Cub

By Don Dutton

Definitely not a J-2. But it's a nice shot...Mark Munzel picture.

The words of Doris Day's 1945 hit recording kept running through my mind: "Gonna take a sentimental journey, sentimental journey home."

We broke over the mountain and there, in the haze-shrouded valley were more than 100 aircraft, most of them yellow, parked in neat rows. A friendly voice welcomed CF-DSD to Lock Haven, PA and, as we joined the downwind leg of the circuit, told us it was our choice - paved runway or grass strip. This was the first day of the 17th annual "Sentimental Journey," the 2002 homecoming weekend for Piper planes at what was once the booming headquarters for Piper Aircraft Corp. But for CF-DSD, Hannu Halminen's restored J-3 Cub that looked as good as the day it rolled off the assembly line in July, 1946, it could be more accurately compared to a visit back to the grandparents. DSD's "birthplace" was the Piper plant then operating in Hamilton, Ontario. Still is was a nostalgic moment, much like arriving at a huge family reunion, as Hannu, an Oshawa RAA member, gently set the Cub on the grass, rolled off between two orange markers and was efficiently guided to a tie-down. We were parked among dozens of other Cubs and just a few hundred yards from the old Piper factory, now home to the Piper Aviation Museum. The flight down from HawkeField, Hannu's strip east of Oshawa, had been a warm, leisurely 3.4 hour trip. (How else can flight in a Cub be described but leisurely?) We went around the west end of Lake Ontario to the first stop at Buffalo to clear customs, then it was south over rugged south-west New York state and on over sparsely populated mountains to this west-central Pennsylvania town beside the Susquehanna River. We were accompanied by a second Cub, flown by Rudy Riss of Newtonville with his son-in-law, Rob Deyell as GPS operator. There were many great looking planes when we arrived and it was only Wednesday, the first day of the four-day fly-in. More continued to arrive as we savored the free bottles of cold water presented to us on arrival. On our way to the registration booth we saw that many at the east end of the field already had tents set up under the wings of their planes - including one group with yellow tents to match their planes. Others were camped in the shade of a nearby row of trees. We met with Ernie Muller, a Toronto RAA Chapter member who planted the idea of flying DSD to Sentimental Journey soon after the restoration began in the HawkeField hanger almost two years ago. After a quick lunch we made a quick late afternoon tour to see what it was all about with the plan to return on Thursday and Friday for a better look at the show quality planes, check out the commercial exhibitors and the seminars in the big tent. There were also lots of old photos, memorabilia and souvenirs at the Piper Aviation Museum.

RAF MARKINGS

For Cub enthusiasts this is the place to check out "authentic" restorations. There were several rare 37-hp J-2's and rows and rows of J-3's including Mike Nolan's "Flitfire" now bearing the distinctive paint job

and RAF markings that it had when it left the Piper factory in 1941. This Flitfire is one of three still flying, said Nolan. These planes toured the U.S. during World War II to raise money for the RAF Benevolent Fund in aid of British widows and orphans. It was yellow when Nolan bought it and he spent six years researching and restoring it to its original glory. "Sentimental Journey" began in 1986 and each year features a different model of Piper airplane. This was the year of the PA-16 Clipper and there were many excellent examples of that model as well as Piper's Cruisers and Super Cruisers, Colts, Pacers and Tri-Pacers, Vagabonds and so on. Other fly-in show planes included a couple of early 1930's Fleet Model 2 bi-planes with five cylinder Kinner radial engines, several Steermans, Champs and Chiefs, Taylorcraft, Luscombes, Stinsons, a few light twins and a DC-3 made a brief appearance. A Standard D25 bi-plane from Old Rhinebeck N.Y. came to hop passengers and helicopter sight seeing flights were also available. The D-25 was designed in 1928 and became a favorite of the barnstormers because they could load four customers in the big barrel-shaped front cockpit. There were also several homebuilts including an "Acro Cubby" built by RAA Exeter's Ron Riley who said he had attended this fly-in at least 10 times. But not everyone flies in. Don MacKay, a member of the London-St.Thomas RAA chapter, who is building a Super Cub replica, had his 5th wheel camper parked here for the week.

A J-2 STORY

The Piper aviation story started in 1931 when William Piper bought the Taylor Airplane Company of Bradford PA and continued manufacturing J-2 Cubs with 37 h.p. Continental A40 engines, recalled Bob Stewart, an 82-year-old from Erie PA. Stewart still flies and talks about aviation and particularly J-2 Cubs with the enthusiasm of a teenager. We watched with amusement as photographer Jim Forney of Pittsburgh struggled into the front (passenger) seat of a little J-2, then loaded a huge movie camera that probably weighed 50 pounds onto his shoulder. There wasn't room to close the window/door combination so his camera hung out in the slipstream as they took off to shoot some documentary footage. The pilot was Stewart's 20-year-old granddaughter, April, Bob explained and the plane, NC16667 manufactured in 1936, was the plane he first soloed in in 1939. In 1993 he became curious about it, tracked it down to a barn where it has been stored since 1947, bought it and restored it. When J-2's came from the factory, Bob said, they had no tail wheel - just a skid - no brakes, no air speed indicator and no carb. heat. "If you wanted extras you had to pay for them, but you have to fly it to appreciate it." The next thing I knew he was lining up his son, Mark (April's father), to take me up in a second family-owned J-2 so I could "appreciate" what he was saying. It seemed like we were barely moving when we lifted off, the J-2's full power climb was probably no more than 40 mph yet it didn't seem unduly long before we were at circuit altitude. On approach, throttle back, it was almost glider quiet as we completed the circuit with the wheels swishing through the grass to touchdown. Then he put on power, lifted off again and said: "You take it." A few moments of doubt - this was a rare bird with no air speed indicator, no turn and bank, a strange throttle control that was just a small steel tube sliding through rings along the left side of the cockpit - but I couldn't resist and I was sure he would take over should I do something stupid. Mark said nothing as the littlest Cub seemed to anticipate my thoughts as we flew the circuit. As I throttled back and turned in to land Mark said: "Just point the nose where you want to go." Then as we neared the ground: "Hold her off." Gentle as a kitten, I thought as it floated to touchdown. With memories of that kind of flying it is no wonder Bob Stewart went looking for his old J-2 again.

As Doris Day sang, Sentimental Journey was "to renew old memories."

Many Restorers Visit Lock Haven

Flyers come to Lock Haven's Sentimental Journey not only to see beautiful old planes but to exchange information on restoration projects, particularly Piper airplanes and find rare parts and authentic instruments of a certain era.

Much is available at the fly-in site and more can be found in nearby businesses. A like new 1944 military surplus bubble face compass that was put in a few Cubs, for example, can be bought from Keystone Instruments, located in a building behind a hangar on the north side of the field. The bubble face compass is priced at $550 (U.S.) but it's pretty rare, explains Keystone's David Stooer. He has a busy instrument repair shop and where even the faces of instruments can be restored to "like new" including the Cub insignia where required, using the silk screen process. Visitors should allow two to three hours to see the many exhibits, old clippings and other historical material in the Piper Aviation Museum which is on the second floor of the old factory. Admission is just $3 (U.S.) for adults and $1 (U.S.) for children. Piper moved the operation to Lock Haven after a 1937 fire destroyed the Bradford operation. William Piper died in 1970 at age 89. If you are not a camper finding accommodation can be a problem. There is a Best Western Hotel in Lock Haven, a smaller hotel and several bed and breakfast operations but I was told that unless you make reservations a year in advance you probably will have trouble now finding a room in town during Sentimental Journey 2003, June 18 to 21. This year we reserved a couple of months in advance and stayed at the Comfort Inn at Lamar which is about a 20-minute drive away. The Fly-In organizers run a shuttle service to the hotels so being that far away isn't a big problem.

This article was reprinted from the Recreational Flyer.

Flyers come to Lock Haven's Sentimental Journey not only to see beautiful old planes but to exchange information on restoration projects, particularly Piper airplanes and find rare parts and authentic instruments of a certain era.

CLASSIFIED ADVERTISEMENTS

Classified Ads are free (within reason) to members. Display Ad rates are:
Business Card:$25 per year
1/4 page: .... $10/month $100/yr
1/2 page ..... $15/month $150/yr
1 page: ..... $25/month $250/yr

Ads that have been in for more than 6 months are subject to removal if space is required for other stuff. Please contact George the editor if you want it kept in.

For Sale: SIROCCO PROJECT
Notice: The author of the following advertisement having returned to his right mind has come to realize that saying $15,000 firm and etc. in the ad was a decidedly unbright thing to say. Therefore, being anxious to sell and unable to work on it himself, he is now willing to (Saints Preserve Us!) NEGOTIATE. Please read on - and call!
Fuselage, canopy, tail group complete. Air frame control components done except for cable. Main-wheel gear, wheels and brakes done. Tail-spring and wheel included. Panel made, no instruments. Lycoming 0-290 GPU Zero-timed. Will Neubert stainless cross-over exhaust with stainless muffler/shrouds. Bendix PSC5 carb. Bendix mags with non-shielded leads. no starter, starter ring or alternator. Weldtech engine mount. McCauley prop.
Wings: ribs and minor spars done. Spar diaphragms done. Two spar-grade spruce planks. No other wing parts.
Jim Hunter 576-2678

FOR SALE:
1957 Tripacer Wings uncovered, all reworked. New leading edge. New ash tip. All Zinc Chromate ready to fabric. Included: 2-18 gal. gas tank, 2 - gas tank cover, landing light, aileron and flap, front and rear struts. Asking $4000 Canadian.
Roger Gauthier (Kelowna) (250)-763-1529 (250) 212-0832 (cel)

Wanted: PA 18 or PA 20/22 Wings. Some damage OK 946-5881

FOR SALE: One set of 1500 Murphy floats ready to go.
Ole #45-3931 198 st. Langley BC 514-1280

FOR SALE: 6 Factory new Franklin 180 hp cylinders includes installed valves $300 each, will not part out.
Tim Novak 271-8586

FOR SALE: Softcom 2 place Intercom ATC-2Y, with accessories $110.
Stuart Gear (604) 941-9402
E-mail:sgear@infoserve.net

FOR SALE: 4130 Annealed Gauge Plate now in stock, .025 to .375. We will sell you the plate or laser cut the parts
Industrial Laser Cutting ltd.
(604) 946-4152, Fax: (604) 946-4153
E-mail: tmw@industriallaser.com

FOR SALE: 1- Miller 200 amp ac/dc H.F. Tig/stick welding machine - 220V 1 ph. $1200. 1- Miller 120 amp MIG (wire) welding machine, 110 volt. Portable sheet metal type, c/w gas kit (almost new) - $800.
Pat O'Donnell 533-1839

FOR SALE: Zenith 250 plans and parts, wing rib moulds $360. Christavia Mk IV project, 4130 steel tube, wing ribs, flaps ailerons, gear legs, wheels and brakes, tail stab and rudder, $3600.
Paul Trudel 532-8570

FOR SALE: Murphy type floats 1500's. $9600 CDN. New, comp[lete with rudders.
Harold Schapansky (604) 826-5068

Blind Nuts By Bill Tee

Probably one of the greatest conveniences we can build into our airplanes is the anchor nut. The anchor nut is usually defined as a self-locking nut with lugs attached for fastening to a panel, usually with rivets.

There are other types of nuts, which provide the same convenience as the anchor nut, but none are quite as satisfactory. These are such things as Avdel nuts, which resist rotation; by friction alone, items such as rivets, which can have a keyway to prevent rotation or the special rivetless nutplate, which uses a spline, fitting with interference pressed into the parent material.

The installation of the latter types is dead simple with no riveting or extra holes to drill. Unfortunately, their function is not as satisfactory. With the Avdel type, a tight thread on the screw or nut, or a crossed thread will cause rotation of the nut. This problem entails considerable work to correct, usually requiring a hacksaw and drill. The keyed or splined nuts are much better at resisting rotation but produce notches and stress risers that reduce the fatigue life of the component. Of course, anchor nuts with reduced rivet spacing also have a similar reputation. In this article, we will deal with only the riveted type anchor nut.

The forms and styles of anchor nuts (or nut plates) are limited only by the imagination of the human mind. The basic, most common anchor nut is the two-lug variety, such as the NAS 680 with sizes from #2 screw thread to 3/8 bolt threads. This nut has an 'ear' projecting from each side which is drilled for a rivet (1/16, 3/32 or 1/8 inch depending on size). These, as with most anchor nuts, come in the fixed or floating (self aligning) style. The floating equivalent would be the NAS 686. This has the same rivet spacing as the NAS 697 or equivalent size. The NAS 1068 is the equivalent but has narrow rivet spacing. The narrow spaced equivalent of the NAS 6880 is the NAS 697.

Floating anchor nuts are valuable to assure that the screws or bolts will align with the nuts. Fixed anchor nuts have to be positioned much more accurately.

The next most common anchor nut is probably the single lug anchor nut. This also is available in the floating, and mini series. These are described as follows, in order:

NAS 682 regular, NAS 687 floating regular, and NAS 696 mini. These nuts are of great value where insufficient space is available for a two lug nut.

The single lug projects only from one side of the nut and has two holes in the one lug for attachment.

Third on our list is the corner anchor nut, colloquially known as the "Mickey Mouse" anchor nut, as its two lugs appear to form the ears of this famous Disney character. This nut is most valuable in corners where no other nut plate will fit. The basic Mickey Mouse nut is the NAS 684 for the standard, and the NAS 698 for the reduced rivet spacing. The standard nut is also available as a floater in the form of the NAS 1766 nut.

The last basic common type is the single lug nut, with the rivets side by side, instead of in line. These nuts are usually avoided except where space indicates it's the only way to go. This nut is the NAS 1067 and is not, I believe, available as a floater or a mini.

Now, as I said, the form of anchor nuts is limited only by the imagination of the human mind. This has bred some rather special items such as the right angle nut plate, and the sealed nut plate , or cap nut as it is sometimes called.

The right angle anchor nut is available in two forms. One, the NAS 1033, comes with the rivet holes in line, like a single lug anchor nut. The other has the rivets side by side and has only two manufacturers at this time. Essna and Boots. The Essna number for this item is 52LHA71 and the Boots number is TB05951032.

Cap nuts are another very valuable specialty, especially for use in fuel tanks, or other areas which are required to be sealed, and also have a threaded fastener through it's skin.

The capnut, identified as NAS 1473 or 1474 (REGULAR 7 MINI) consists of usually a floating anchor nut encased in a metal dome. An 'O' ring is installed in the base of the nut to seal against a flat surface. Commercial aircraft manufacturers also use a sealant suitable for the purpose, e.g. PR1422-B2 for fuel tanks, to ensure no leaks.

Surely the inventor of the anchor nut, nut plate, or whatever you care to call it deserves a medal.

This small device can make working on aircraft easier, far greater than its small size would indicate.

Not only does it mean that areas can be closed in, and still have a fastener installed, but the anchor nut can be used in a location where wrenching is not possible or where one's arms are not long enough to hold a wrench on a nut and a bolt both, such as installing a windscreen. I'm all in favour of labour saving devices, and this is one of the best.