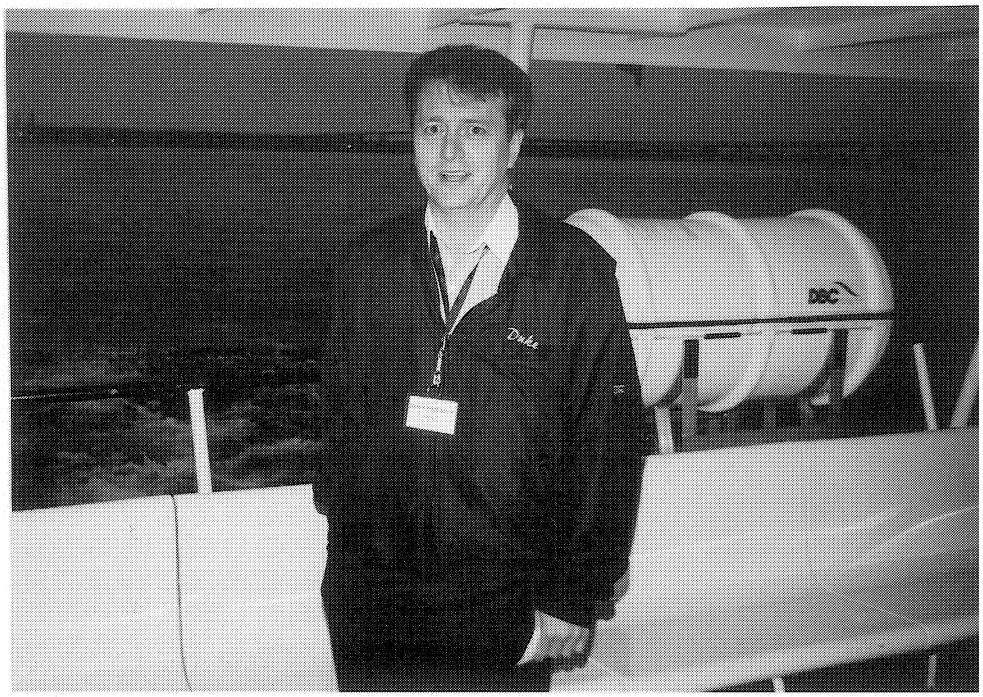
FLYERS ASSOCIATION NEWS

NUMBER 02-3 **NOVEMBER 2002**



RON COMEAULT
1954 – 2003

Ron, our host at the 2002 Sault Ste Marie, Ontario fly-in, was killed along with Stefan Skoppe, President of Turbine Innovations of Melbourne, FL in his V-8 powered Duke, October 23, making an approach to Jesup, Georgia Airport. A sincere loss to all who knew and respected him.

Spare parts on hand for your Duke

1 - Generator
1 - Starter
1 - Pilot Hydraulic Seat Control
1 - 5 x 6.0 Nose Wheel Tire
4 - Prop Brush 3E1206-2
6 - T10541 Cylinder Assemblies
1 - Gear Motor
4 - Voltage Regulators (see below*)
2 - Oil Coolers
1 - Magneto
1 - Lycoming Exhaust Pipe Part No. 77429
1 - 19 x 6.75-8 Main Gear Tire
1 - 19 x 6.75-8 Main Gear Tube
1 - Flap Motor
Recognition Light Bulbs, DN25-3
1 - Tach Generator

The arrangement we have with Aircraft Systems, 5187 Falcon Road, Rockford, IL 61109, is they will ship an O/H generator, starter, magneto, or motor to you by UPS or Federal Express. You return to them (same day) your part. They will overhaul, charging for work done and the item becomes Association emergency part. Phone number 815/399-0225.

For oil cooler contact Gary Bongard, 952/944-2628 (office).

For other items contact Jim Gorman 419/755-1223 (office – mornings Eastern time)

Remember: Overhaul of generator at 900 hours will cost you three times more than O/H at 500 hours.

✈ ✈

New instrument check valves from Duke Flyers (Jim Gorman) are priced at $595.00 plus shipping. Part #HE7007-5

✈ ✈

Dan Truszkowski advises American Cooler Service, 921 W. Mayfield Road, Suite 136, Arlington, TX 76015, 817/419-8008 offer recored Duke oil coolers for $575.00 exchange or $775.00 outright. Also our Association has purchased 2 new oil coolers which Gary Bongard 952/944-2628 has in stock. Price is $995.00 FOB Eden Prairie, MN.

✈ ✈

Ken Bowdish reports a number of owners asked where he obtained polish for spinners. Contact Nuvite Chemical Compounds Corporation, 213 Freeman, Brooklyn, NY at 1-800-394-8351 and ask for Grade S.

✈ ✈

Gary Bongard has a source of windshields. Contact him at 952/944-2628.

Ron hosted a wonderful fly-in for 35 airplanes along with owners and guests last September. Activities included a dinner cruise through the Canadian and American Locks, a trip on a Gawa Canyon tour train and our Saturday night banquet at Heritage Bush Plane Museum. Saturday afternoon, Ron flew his V-8 powered Duke. Sound was very different and appeared to be quite a bit faster.

Ron led a very active life. After graduation he served with Royal Canadian Mounted Police. He graduated from National Hockey League of refereeing, was a Notary Public in Alberta and Commissioner of Oaths for Province of Ontario. Ron was also active in his Catholic Diocese serving on many Boards, Rotary Club. His love of flying involved him in Young Eagles program and Hope Air which arranges free air transportation for Canadians in need. Ron was an investment advisor for RBC Dominion Securities Inc., and the father of four children.

Duke Flyers Association will make a donation to Hope Air and Heritage Bush Plane Museum.

✈ ✈

There were four important sessions at the Sault:

1) Paul McBride of Lycoming went over the care and feeding of the 541 engine.

   a. Preoilers are very desirable
   b. Minimum RPM at start (550-600)
   c. 800 RPM til movement of cylinder head and oil temperatures are increasing
   d. Slow and steady movement of throttles
   e. Lycoming is aware of lifter/cam problem. Until solved recommend inspection of lifters every 100 hours. Will probably catch any spalling before it affects the cam.
   f. When asked about use of Shell 15-50 oil, it was his personal opinion if you use the Shell brand of oil, stick with straight weight 100 or 50. Paul was Service Manager of Piston Engines for many years.

   Answering the enclosed questionnaire will assist Lycoming in solving lifter problem.

2) Mark Seader presented the following:

   The Firewall Forward self-lubricating camshaft modification for the 541 series engine was developed specifically to reduce the camshaft & lifter wear. The modification is relatively simple in that it directs engine oil into the hollow interior of the camshaft via the camshaft bearing oil feed from the crankcase,

which then is routed to each lifter and lobe by oil passages drilled into the cam lobe itself. The only modification in this process is the actual drilling of the camshaft lobes, and the sealing off of both ends of the camshaft to create the positive oil feed function. Prior to the design of this modification, extensive testing was accomplished using forensic metallurgists, and aerospace heat treating specialist's in the testing of both failed & normal wear high time lifters. As far as hardness & depth-of-hardness, no lifters or cam lobes were found to be outside of Lycoming manufacturing parameters.

An infrared thermal imaging video camera was obtained and mounted in such a way as to video the full length of the camshaft and lifters during operation in a live Duke engine. This equipment was used for the purpose of providing a "thermal mapping" of the camshaft & lifter faces in both color thermal imaging during engine operation, and direct digital readout, to determine the actual lubrication efficiency of the splash oil vs. the direct oiling method at differing RPM's. The data obtained during slow motion playback, provided the information necessary as to the exact size & location of the oiling holes. The result was a substantial decrease in camshaft & lifter operating temperatures, with a corresponding increase in the hydrodynamic planing between the sliding surfaces. Hundreds of hours of test runs showed dramatic wear improvement.

Some noteworthy observations from several years of research are as follows: 1) The crankcase environment is not equal within the three "bays" inside the crankcase. Upon examination of numerous camshafts over several years of evaluation, it was discovered that some lobes were 95% more prone to failure, while other lobes where in the 95% success category, in that they failed in less than 5% of the failed camshafts. 2) Camshaft temps *increased* at lower RPM's rather than decrease as one would expect. It was found that one of the general rules of "Tribology" (the science of friction & lubrication) is that velocity, or the speed of the sliding surfaces enhances the hydrodynamic planing of the sliding parts if lubricant is present. 3) Oil was being heated beyond its maximum operating temperature. 4) Initial exhaust gas contamination investigations within the crankcase environment & oil, reveal a detrimental effect on oiled surfaces by the reduction of lead, and an increase in corrosive acids. (The change to LL100/130 avgas was the cause of TCM exhaust guide failures due to lack of lubrication and rendering the platinum fine wire plug obsolete due to corrosion). 5) This design provides positive lubrication to the camshaft at the lifter face 13 seconds after cold start up.

In conclusion: The FWF camshaft has both U.S. and International patent pending approval. FAA approval is anticipated by the end of the year. The FWF 100% engine warranty will be increased dramatically, with a modest engine overhaul price increase. This camshaft will be incorporated into all Lycoming engines overhauled by FWF.

3) Gary Bongard and his partner related work they are doing on the lifter problem. Experience has shown lifter spalling occurs first and then transfers to the cam (see Paul McBride's comments on checking lifters). At the 2002 fly-in they had samples of old and new lifters which showed a marked difference in metallurgy (old being much better). They now have redesigned the lifter and have over 800 hours in a Duke engine with no spalling . Their STC is now at FAA Great Lakes waiting approval. We hope to have the complete story in the first Newsletter of 2003. In the meantime, contact Gary if you are interested at 952/944-2628.

4) Probably the most important session of the fly-in was presented by Earle Olson. While lifters and cams are an expensive problem, failure of the instrument check valve can kill you. As Earle explained, if one or both of the small rubber flap valves has broken loose, it will block air flow to your flight instruments.

We strongly recommend this valve be replaced at your next annual. Until then, follow the procedure outlined in Raytheon safety communique included in Newsletter 02-2, Page 3 and 01-2, Pages 4 and 5.

Your Association has 10 valves on order for early December delivery. Order yours now. See Page 2.

WELCOME NEW MEMBERS

Richard Bailey P-174
8070 E. Morgan Trail, Suite 100
Scottsdale, AZ 85258

Judd Kessler P-540
P.O. Box 100
Rancho Santa Fe, CA 92067

Ronald Donley P-482
55287 Southern Hills
LaQuinta, CA 92253

Gregory Wicker
5 Robin Lynn Lane
Imo, SC 29063

James Johnson P-303
22 Marsh Creek Road
Amelia Island, FL 32034

Al Seither P-105
88 Morgan Creek Road
Earleville, MD 21919

Roman Stevens P-81
427 Mechlins Corner Rd.
Pittstown, NJ 088

Frank Shumate P-420
P.O. Box 2047
Rockport, TX 78381

Duane Ortynski P-449
43 3333 Chancellor Pl.
West Bank, BC
Canada V4T 259

DUKE OWNER ENGINE HISTORY QUESTIONNAIRE

Name _____ Aircraft N Number _____

Street _____ Aircraft Serial No. _____

City/State _____ Phone Number (O) _____

Zip Code _____ (H) _____

E-Mail _____

Engine Make Lycoming

Engine Model T10541 E1C4

Engine Serial No's Left _____ Right _____

Total time on the engines since new Left _____ Right _____

Total time on engines since last overhaul Left _____ Right _____

Calendar time since the engines were last overhauled Left _____ Right _____

Assume the engines have been rebuilt or overhauled more than once in their entire life, was there an overhaul that went to TBO before you experienced problems with the cam or lifters? Attach separate sheet if necessary.

Number times overhauled _____ Topped ? Yes _____ No _____

_____

_____

If your last engine overhauls were done by the factory, were the engines overhauled ____

Reman/Rebuilt _____ or factory new _____

If your engines were overhauled by another facility, please tell us who and was there anything special about the overhaul _____

Was the cam reground and used again? Yes _____ No _____

Was a new cam installed? Yes _____ No _____

Were new lifters installed at the overhaul? Yes _____ No _____

Were new cylinders installed at the time of overhaul? Yes _____ No _____

Do you have pre-oilers on these engines? Yes _____ No _____

Do you have intercoolers? Yes _____ No _____ Make _____

Do you have Tannis heaters installed on your engines? Yes _____ No _____

How long do you leave the Tannis heaters plugged in before flying? _____

Do you leave them plugged in all the time? Yes _____ No _____

If you have any other modifications to the engine, list them on a separate sheet.

Engine total time since the last overhaul that you first discovered cam/lifter problem.

Left _____ Right _____

How did you first notice or find the problem? Use separate sheet if necessary.

_____

_____

Were you inspecting the lifters on a periodic basis? Yes _____ No _____ at what frequency _____

Make and type of oil you use _____ SAE Weight _____

Do you ever mix brands? Yes _____ No _____

Do you add the additive LW16702 if required? Yes _____ No _____

How often do you change oil? 25 hrs _____ 50 hrs _____ Other _____

Oil consumption per hour Left _____ Right _____

Do you use oil analysis? Yes _____ No _____ What lab _____

Do you feel that the oil analysis helped in finding a cam/lifter failure early?

Yes _____ No _____

Do you or your mechanic cut open and carefully inspect the oil filter at the time of an oil change? Yes ____ No ____. If so did this process alert you to an impending failure? Yes ____ No _____. What kind of contaminant in the filter did you see that first alerted you or your mechanic of the problem?

_____

_____

When you first noticed a cam/lifter problem, were there any other engine symptoms that were apparent? I.e., low cylinder compression, excessive blow by, oily plugs, low oil pressure, high cyl temps, etc.

_____

_____

How often do you calibrate your TIT gages? _____

How long have you been with your current maintenance facility? _____

Do they maintain other Dukes besides yours? Yes _____ No _____

Did the engine produce normal take off/climb/cruise power up to the time of the cam/lifter problem? Yes _____ No _____

Does your engine oil turn pitch black shortly after an oil change? How many flight hours does this take? Left _____ Right _____

How often do you fly your aircraft? _____

Does it ever sit for a long time without flying? Yes _____ No _____ If so how long _____

Do you keep the airplane in a hangar? Yes _____ No _____

Is the hangar heated? Yes _____ No _____

Is humidity a problem in your hangar? Yes _____ No _____

Does the airplane sit outside for any length of time? Yes _____ No _____ If so where and how long _____

At start and warm up what engine RPM do you run your engines? _____

Please feel free to submit any other data you would like that is not covered on this questionnaire.

Cut off date to return this form is 30 Jan 2003 allowing us to forward results to Lycoming in a timely manner. Send to Ken Bowdish, 705 Old Orchard Road, Harvard, IL 60033-1848.

MEMBERSHIP RENEWAL

The annual meeting of Duke Flyers Association held at Sault Ste Marie, Ontario passed a resolution establishing a dues structure of $100 US for 4 years.

If your membership number is 630 or lower (check membership roster for your number), it is time to renew.

Make your check out to Duke Flyers Association for $100 US and mail to Duke Flyers, P.O. Box 2599, Mansfield, OH 44906-0599 and at the same time update the following information:

Members name _____ Club # _____

Mailing address _____

City _____ State _____ Zip _____

Spouse (First Name) _____

Office phone _____ Fax _____

Home phone _____ E-Mail _____

Duke 'N' number _____ Duke Serial # _____