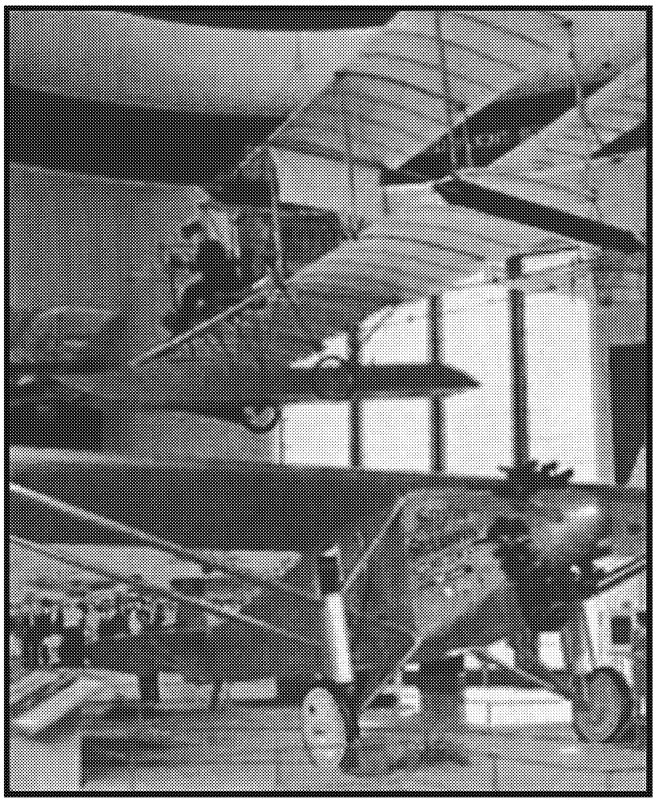
Duke

FLYERS ASSOCIATION NEWS

NUMBER 03-1 **APRIL 2003**



SAN DIEGO AEROSPACE MUSEUM

This year's fly-in will be held in San Diego, California, September 25 – 28. Our host, Shaker Razook has great plans. Thursday night is a Mexican fiesta, exclusive use of Aerospace Museum in Balboa Park for dinner Friday night and a gala banquet at headquarters in Westgate Hotel on Saturday. Mark the dates now. Registration information will be sent in the near future. Plan now to attend.

President	Vice President	Secretary-Treasurer
Mike Greenblatt	Max Cohen	Marge Gorman
P-590	P-412	P-596

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 (New)
1 - Gear Motor
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 Bill Passey, 602/969-2291 (office).

For other items contact Jim Gorman 419/755-1223 (office).

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

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Dan Buhl discovered one of the new HE-7007-5 Check Valves was defective

Before you install the valve if purchased from Rapid, perform a simple check to make sure yours is ok:

1) Cover both large center tubes tightly with duct tape to block the airflow from the.

2) Place your finger over the small tube and blow gently into that end. No air flow should result.

3) Repeat #2 at the other end.

Rapid (Beech) have reduced the price from $1400. to $647 at our request. The Association still has 5 valves at $595, and tested before shipment. Contact Jim Gorman.

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Ken Bowdish reports a number of owners asked where ht 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.

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Many of you with membership numbers below 631 have not renewed. Your Association persuaded Raytheon to reduce the price on manifold check valve by $750.00 which must be installed to comply with mandatory Service Bulletin SB36-3525. We would hope saving you this much money is worth a $100 four year renewal. See attached form.

Enclosed are the results of questionnaire authorized at Sault Ste Marie. Ken Bowdish did a great job of collecting data and presenting it in a readable form. He has sent results to Paul McBride at Lycoming.

As reported in survey, Firewall Forward have now received the STC on their self lubricating camshaft.

Gary Bongard expects to receive the STC on their lifter soon. See Newsletter 02-3, Page 5.

Al Uhalt has again brought up to date with the enclosed index.

Association still has a few manifold check valves. See Page 2 of this issue.

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Glenn Adams, an interesting member

In 1999 Royal Air, Inc. (Glenn's company) in Shreveport, Louisiana (DTN) started chartering and fractionalizing Dukes. This necessitated a shop that specializes in Duke maintenance and repair. In the last three years they have completed several restorations of earlier model Dukes, dozens of annuals, and managed to build an extensive parts inventory to help them maintain the ten Dukes on the field. They also have many aircraft that are good restoration candidates. They are looking for buyers unafraid of participating in a restoration project. If not and if the economy does not improve soon, they will be forced to part them out.

As you have probably already guessed, Glenn is quite fond of the Duke. He is flying the Duke 20-40 hours per month now and would not trade it for anything. In the last three years he has had the opportunity to meet or talk with many others who find this aircraft just as incredible as he does. This is why he has committed his resources to building a repair facility that works almost entirely on Dukes; a fractional ownership program that which in time will dispel all of the Duke's negative reputation; and participate in exploring new solutions for old problems so that your Duke can once again be considered by most as "Best in class."

He invites any of you to stop in and look at his facility when you are in the area. Downtown Shreveport offers five riverboat casinos with weekly big act entertainers.

For the months of April – June, 2003 they are offering Duke annuals for $2,200.00 with $1.99/gal top off. Promotional specials include 10% off heated windshield list of $9,250.00/exchange with Annual, or pre-oiler installation for $2,995.00 with annual.

ENGINE SURVEY REPORT TO THE DUKE FLYERS ASSOCIATION
An Overview

At our annual fly-in in Sault Ste. Marie this past September, our host Ron Comeault arranged to have a representative from Lycoming join us to discuss the 541 engine and particularly the problems that we have with the cams and lifters.

Paul McBride, Regional manager for Lycoming was sent to Sault Ste. Marie to meet with us. Paul is a 30 plus year veteran employee of Lycoming and is familiar with the cam/lifter problem in our engine as well as other significant problems the Lycoming faces at this time.

Cam/lifter problems dominated the subject matter of the meeting. We talked about the entire manufacturing process of cams and lifters , everything from raw material sources to the vendors producing the parts and the quality control systems at Lycoming. We discussed some of the problems Lycoming has faced over the years. Serious labor problems, a long bitter strike in 1997, the sale of machinery and equipment, the termination of many of their employees, some with lots of shop knowledge and the outsourcing of parts that Lycoming previously produced. We brought these issues up in the meeting. Paul answered by saying that top management at Lycoming was working on fixing these problems as we speak.

Lycoming appears to be doing just that, I reference a short article in February ,2003 issue of Twin & Turbine magazine, page 64, that discusses the changes that Lycoming has made in producing crankshafts for the 540 engines. If you haven't read it, find a copy of this magazine and read it . I know we don't use that engine in the Duke, but hopefully Lycoming will apply this same review process to our TIO541 engine.

After the meeting, it was decided by our organization that we should conduct a survey of the membership regarding our engines and the cam/lifter problems that we have experienced. We also wanted to hear from owners that had not any cam/lifter problems. Hopefully the data that we assembled might not only be informative to us , but also assist Lycoming in trying to solve this problem. I was strong armed by five big guy's and tapped for the job. Paul McBride helped me develop some of the questions we sent out in the survey.

Enclosed you will find a tabulation of the survey results for the two groups of owners, those that have had cam/lifter problems and those that have not had any cam/lifter problems. Then you will find my summation of these results and a few of my comments.

I learned just a few days ago that ,Lycoming is setting up an independent review panel to assist the company with safety, quality, and compliance systems and processes. The panel is headed up by Michael J.Dreikorn. He is assembling a panel of aviation experts that will help Lycoming set up long term strategies that will for improvement of there operations I had a conversation with Mr. Dreikorn on Feb 9, 2003 about our survey. He wants to include this data for the members of the panel he is organizing.

We will also be sending a full report of our survey results to Lycoming. Hopefully they will find this information useful

Respectfully

Ken Bowdish .

Duke engine survey results and comments

We had 23 owners respond to this survey. They all did a good job as several of the questions required that they dig into their log books to get the answers.

11 owner's reported cam/lifter failures with their current engines, 12 owner's indicate they have not had a cam/lifter problem of any kind in their current overhauls.

It is interesting to note that some of the owner's currently reporting engines that have cam/lifter problems now, had prior overhauls go to TBO without any problems. Likewise we have owners in the group that are currently reporting no problems with their current engines but had problems with cams/lifters in prior overhauls.

From this analysis it would seem that we have a better than 50-50 chance of having this cam/lifter problem.

Yet, there are exceptions. Two airplanes in this survey still have their original engines. They have never been overhauled.

One was based in the Phillipines until last year and is now owned by Firewall Forward. There are1440 Hours on the engines and the airplane. The cam and lifters were inspected and found them to be in perfect condition. The engines were running on Aeroshell 100 W oil without the Lycoming additive. Oil changes were done at 50 hours. The engines are 25 years old.

We have another member of our group that has an airplane with its original engines These engines are 27 years old and have 1448 hours on them. Oil being used is Aeroshell 100W.The Lycoming additive is being used.

Referring to the chart. Owners that have had cam/lifter problems. The first column is the total time on the engine since new. The second column is the total time on the engine since that last overhaul. Note that where those times are the same in both columns the owner had a factory reman or a factory rebuilt engjne overhaul. Both types zero time the engines

The third column lists the hours that were on the engine when a cam/lifter problem was first noticed.on the current overhaul.

The calendar time is the calendar time since the last overhaul, before the engine developed cam/lifter problems.

We have 11 respondents in this group that have had problems with the cams/lifters. However not all the engines have given trouble. 18 engines have had cam/lifter problems. Reviewing the calendar overhaul times on those engines we see that we had one engine that had 15 years on the overhaul before it gave trouble Two engines had 10

years on them before they gave trouble . The rest of the engines have been overhauled within the last 2 – 8 years which is 11 of the 18 engines or 61% of the total engines.

Hours on the overhaul when the cam/lifter problems first occurred range from 105 hours to 3 of the engines that almost made TBO. The rest range from 300 hours to 915hours.

In the group of owners that have not had problems with the cam/lifter we have 3 engines with 2 years on the overhauls and one engine with 3 years on the overhaul As a group we have 13 engines with calendar overhaul times ranging from 6 years to 17 years or 59% Then we have the two airplanes with their original engines

We discuss this same subject every year during our maintenance seminar. Now we have some data to show Lycoming that seems to indicate that something changed 8-10 years ago in the way they make the cams/lifters.

10 owner's had engines overhauled at shops other than the factory. The rest were done at the factory, either as factory overhauls or as factory remanufactured or rebuilt engines, it made no difference, they all have trouble with the cams and lifters. This is further evidence and data that there is a parts problem.

You will also notice that we had 2 owners with reground cams that reported problems with cams/lifters. 3 owners with reground cams have not had trouble with there cams/lifters.

It has always been my contention that if the cam is made correctly in the first place and it is reground and re-heat treated properly it can be used again. I am not saying that a reground cam is better, not at all. I am saying this is another indication that because cams can be re-ground and used again successfully that it is further evidence, that the lifter is the first to fail in the valve train system.

No one used the old lifters over when they overhauled the engines. If the older lifters were made "better" then perhaps this is the reason our data for the older engine overhauls shows better results.

We asked the question on the use of old or new cylinders for the following reason. Often times when a cylinder is overhauled the valve seat and face are machined. This can easily change the length of push rod required to give the proper dry tappet clearance. Believe me, if you want to ruin a cam and lifter assembly, run the engine without the proper dry tappet clearance. We had 3 reports of old cylinders being used in overhauls. 2 owners had cam lifter problems, one owner has not had a problem.

The valve train in this engine is complex. The materials used are taxed to their limits, there is no extra window or margin for error in the manufacturing process or the quality of material used to make the components. Particularly, the cam and lifters. The same

applies to the oil that is used to lubricate the system. A book entitled High Speed Combustion Engines by P.M. Heldt published by Chilton Company is a good reference. Chapter 14 covers the subject of "Valve Actuating Mechanisms". This chapter covers the entire valve train, however there is a section of this chapter entitled "Cam and Tappet Loadings" I will try to summarize a couple of important points. In cams where the top radius is quite small, (and need to be, because of design criteria) the blow dealt by the tappet is lighter (as the nose of the cam is made sharper). However for a given maximum spring pressure, the stress in the material of the cam nose and the follower(tappet) is greater the smaller the top radius and excessively sharp nosed cams are apt to give trouble. To help alleviate this and other problems, the cam is made with a slight taper in the axial direction. This along with a spherical shape on the tappet provides rotation of the lifter as it operates in the engine. Further in this chapter there is a section "design of valve tappets" Lifters or tappets are generally made of a high grade cast iron that is hardened by the "chilling " process, which is usually sufficient. However tappets which require a better wearing surface are made of Stellite or some other very hard alloy.

If you are interested in more this book is listed in the Library of Congress catalog card number 56-7882. The copy I have is the 16th edition published in 1962.

The technology used to produce our engine is not new, but it does have to be done right.

This brings me to the question we had on the survey of how long does it take for the oil to turn pitch black after an oil change. Oil that is pitch black is contaminated with combustion by-products that degrade the oils ability to lubricate. With the thin margins that we are dealing with, the longer we can keep the oil clean, the better we lubricate the cam and lifter . Our survey shows oil in the engines that did not have cam/lifter problems stayed cleaner longer (more hours) on average than those engines that reported cam/lifter problems.

Besides the usual cylinder blow by problems that can cause oil to turn black be sure that the breather hose is clear and open. The gang pipe breather drain, has an extra stand pipe on it that is not used, make sure it is open. Both of these can cause a small amount of case pressure in the engine which can make it difficult for the rings to seat properly.

We have had lots of discussions on oil. From the evidence presented here it seems as though you can use any of the oils that are approved for this engine. Nobody in the survey mixed brands of oils. Be sure to add the Lycoming additive if it is required.

Everyone, inspected the oil filter when they changed oil. I am assuming that the filter element is being washed in a separate pan of solvent, then the solvent run thru a paint strainer and the contents of both the pan of solvent and the paint strainer examined carefully under a good light and with a magnet . It would be nice to have some "museum pieces" of materials that are definite no-no's in our inspection of these filters. Maybe we could do that some time in the future.

With regard to the frequency of oil changes, both groups had similar responses. I'd like to see everyone change oil at 25 hour intervals, especially if the oil turns pitch black shortly after the oil change.

No one responding to this survey said that oil analysis helped them find or identify a cam/lifter problem. Some made strong comments as to how useless oil analysis is. In fact several owners that were doing oil analysis have stopped using the process.

There is no preventative measure that I know of that will predict the failure of the cam/lifter but it is interesting to note the first indications of trouble that were observed by this survey group.

The majority of respondents first noticed metal flakes in the oil filter. But we had two owners that first noticed a significant drop in oil pressure. Also, in both cases, the oil pressure drop was reported to be intermittent. Investigation in both cases showed metal in the oil pump housing which caused leakage in the pump and low output pressure. Two failures were first noticed in surging manifold pressure (turbochargers). Metal was found in the wastegate and or the density controller. Two others had no prior engine indications but found the problem by inspections. One while changing a push rod tube seal, the cam lift was noted to be low by observing how far the valve was being opened. The other failure was found by inspecting the lifters during maintenance.

It would be nice to know more about the oil pressure and turbo surging failures. I think that might be interesting to us all.

Six of our respondents use digital TIT gages, 3 owners never calibrate their systems 8 calibrate them annually and one calibrates his on a need be basis. I think we all know that keeping this system working properly is extremely important. One respondent noted on his survey that he burnt up a set of cylinders (on both engines) because he was running them to hot. He made the comment , that was expensive.

There has been considerable discussion on pre-oilers. In the survey I don't think we see any pattern that is directly related to our cam/lifter problem. 4 owners have them installed on airplanes that have had cam/lifter problems, 2 owners have them installed on airplanes that did not report problems. They certainly don't hurt anything.

Everyone in this survey that needs to pre-heat the engine before start-up reported some way of doing that.. No one in this survey abuses there engine by starting them cold. I might point out that Lycoming considers anything below 60 degree F a cold start.

Inspecting the lifters on a periodic basis, kind of interesting, 9 of 11 owners that have had cam/lifter failures do not check the lifters. Two said they check them at 100-200 hr. intervals. 5 of the 12 owners that have not had cam/lifter problems do not check them at all, 4 owners did not respond to the question and 3 do check the lifters periodically. The best you can hope for is catching the failed lifter before it damages the cam

Our respondents for the most part have been with their current maintenance facility for long periods of time. That is a good sign. This provides good trend monitoring and familiarization.

Start up procedures that were turned in on the survey would indicate that no one is abusing the engines. I would say that the slower the RPM the better, until you get oil pressure and then warm the engine up slowly. However I dug up an old article from Light Plane Maintenance March 1988 A Duke had a nose gear collapse. When they tore the engines apart for a sudden stoppage inspection they found one of the engines lifters spalled. What should I do the owner asks? The article tells him to put in new cams and lifters, check dry tappet clearance prelube all parts etc,etc. They then go on to say that and I quote "Use AD oil and Lycoming LW-16702 oil additive from the beginning and *avoid idling under 1,500 rpm during the first 10 minutes of operation.* (This is to ensure good oil flow to the cam and the lifter faces.)" quote, unquote. No further comment.

I don't see anything that we as owners are doing wrong that could cause the cam/lifter problems that we are experiencing. On the whole I think we maintain and operate these airplanes and engines better than they have ever been operated before. We can be proud of that.

I feel that if Lycoming really follows through with improvements to their operations that I have cited in my report to the membership we will be on the right track Hopefully they will address our problems soon..

Mark Seader, at Firewall Forward has just received his STC for the oil lubed cam. This is a definite improvement and will certainly help our cam and lifter problem Some automotive engines cams are lubed in the same manner. I seem to recall that one of the geared engines produced by Continental had a cam with holes in the lobes to help lube it. Congratulations are in order to Mark and his team at Firewall Forward.

The carbide faced lifter is another major improvement. I understand there are several engines in airplanes operating with these lifters at this time and that the STC is close at hand. The chilled iron process is not easy to do. It could be termed a "black art" and it is possible that currently manufactured lifters have lost that art. The trick with the carbide faced lifter is attaching the carbide face to the lifter body. That is not an easy task, but I understand that Gary Bongard and his partner have developed a process to do just that and in fact have applied for patents on the process. Good luck guys

Maybe with changes at Lycoming, a cam that is lubricated directly and carbide faced lifters we will have an answer to this cam/lifter problem.

OWNERS THAT HAVE NOT HAD CAM/LIFTER PROBLEMS

T.T. SINCE NEW		T.T. SINCE SMOH		CAL TIME SMOH (YRS)		O/H SHOP	COND. AT O/H CAM LIFTER CYL		
LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT				
2766	2766	1137	1137	9	9	FWF	RGD	NEW	OLD
2227	2227	1443	458	13	3	FACT. REMAN	NEW	NEW	NEW
2599	1115	1029	1115	16	17	L TW SMITH	NEW	NEW	NEW
						R FACT. REMAN	NEW	NEW	NEW
3230	3230	440	440	8	8	FWF	RGD	NEW	?
4200	4200	240	240	2	2	FWF	RGD	NEW	NEW
4100	3002	850	650	?	?	?	?	NEW	NEW
2331	2331	1043	1043	9	9	FACT. REMAN	NEW	NEW	NEW
1448	1448	1448	1448	27	27	ORIGINAL ENGINES			
3700	3700	920	920	6	6	FWF	NEW	NEW	NEW
1440	1440	1440	1440	25	25	ORIGINAL ENGINES			
720	720	DNA	DNA	7	7	FACT NEW ENGINES			
150	250	150	250	2	3	FACT. REBUILT	NEW	NEW	NEW

FWF= FIREWALL FORWARD
RGD = REGROUND

WHEN THE FIRST AIRCRAFT IN THE LIST ABOVE WAS BRAND NEW BOTH ENGINES HAD CAM/LIFTER FAILURES AT 671 HOURS THE OIL BEING USED WAS THE PHILLIPS X-C WITHOUT THE LYCOMING ADDITIVE. FACTORY NEW ENGINES WERE INSTALLED THEY RAN TO 1631 HOURS BEFORE BEING OVERHAULED. OIL USED WAS AEROSHELL 15W50, THE ADDITIVE WAS USED. THOSE ENGINES WERE OVERHAULED AND THEIR STATUS IS REPORTED ABOVE. CURRENT OIL BEING USED IS AEROSHELL 100W PLUS

THE PRIOR SET OF ENGINES ON THE SECOND TO THE LAST AIRCRAFT IN THE ABOVE LISTING HAD BOTH ENGINES FAIL DUE TO CAM/LIFTER PROBLEMS. THE OWNER STATES THAT OIL ANALYSIS WAS OF NO VALUE WHATSOEVER. HE ALSO STATED THAT ROUTINE OIL FILTER INSPECTIONS WERE NORMAL. METAL WAS FOUND IN THE OIL PAN SCREEN AND DRAIN PLUG DURING A ROUTINE ANNUAL INSPECTION.

QUESTION ON PRE-OILERS

2 OWNERS HAVE THEM INSTALLED
1 RESPONDENT DID NOT ANSWER THE QUESTION
9 OWNERS DO NOT HAVE THEM INSTALLED

INTERCOOLERS

5 OWNERS HAVE INTERCOOLERS (AMERICAN)
1 OWNER DID NOT ANSWER THE QUESTION
6 OWNERS DO NOT HAVE INTERCOOLERS (1 OWNER HAD THEM BUT TOOK THEM OFF)

ENGINE HEATERS

9 OWNERS DO NOT HAVE THEM INSTALLED
1 OWNER DID NOT ANSWER THE QUESTION
2 OWNERS HAVE THEM INSTALLED AND USE THEM AS FOLLOWS
  1 OWNER PLUGS THEM IN AT LEAST 12 HOURS BEFORE STARTING THE ENGINES
  1 OWNER LEAVES THEM PLUGGED IN ALL THE TIME

DO YOU INSPECT THE LIFTERS ON A PERIODIC BASIS

2 RESPONDENTS CHECK THERE LIFTERS ANNUALLY
1 RESPONDENT CHECKS THE LIFTERS EVERY 100 HOURS.
4 RESPONDENTS DID NOT ANSWER THE QUESTION
5 RESPONDENTS DO NOT PERIODICALLY CHECK THE LIFTERS

MAKE AND TYPE OF OIL USED

4 OWNERS USE AEROSHELL 100W PLUS
1 OWNER USES PHILLIPS 20X50
3 OWNERS USE AEROSHELL 100W
2 OWNERS USE EXXON ELITE 20X50
2 OWNERS USE AEROSHELL 15W50

OIL CHANGE FREQUENCIES
3 OWNERS CHANGE OIL AT 25 HOUR INTERVALS
1 OWNER CHANGES OIL AT 30 HOUR INTERVALS
2 OWNER CHANGES OIL AT 33-40 HOUR INTERVALS
2 OWNERS CHANGE OIL AT 35 HOUR INTERVALS
3 OWNERS CHANGE OIL AT 50 HOUR INTERVALS
1 OWNER DID NOT RESPOND

OIL ANALYSIS

6 RESPONDENTS USE OIL ANALYSIS
6 RESPONDENTS DO NOT USE OIL ANALYSIS

2 OWNERS COMMENTED THAT OIL ANALYSIS IS USELESS

ALL RESPONDENTS CUT OIL FILTER OPEN FOR INSPECTION

CALIBRATING TIT GAGES

3 OWNERS HAVE DIGITAL GAGES AND DO NOT CALIBRATE THEM
3 OWNERS NEVER CALIBRATE THERE GAGES
6 OWNERS CALIBRATE THERE GAGES ANNUALLY

TIME WITH CURRENT MAINTENANCE FACILITY

1 OWNER 2 MONTHS
1 OWNER 3 MONTHS
1 OWNER 1 YEAR
1 OWNER 4 YEARS
1 OWNER 5 YEARS
2 OWNERS 7 YEARS
1 OWNER 8 YEARS
1 OWNER 10 YEARS
2 OWNERS 20 YEARS
1 OWNER 30 YEARS

NUMBER OF FLIGHT HOURS IT TAKES FOR THE OIL TO TURN PITCH BLACK AFTER AN OIL CHANGE

1 RESPONDENT REPORTED 20-25 HRS. BOTH ENGINES
1 RESPONDENT REPORTED 20 HRS BOTH ENGINES
1 RESPONDENT REPORTED 35 HRS. BOTH ENGINES
2 RESPONDENTS REPORTED 10 HRS BOTH ENGINES
1 RESPONDENT REPORTED NEVER ON LEFT ENGINE 10 HRS. ON THE RIGHT ENGINE
1 RESPONDENT DID NOT ANSWER
1 RESPONDENT REPORTED 35 HRS. ON THE LEFT ENGINE 20 HRS. ON THE RIGHT ENGINE
2 RESPONDENT REPORTED 5 HRS. ON EACH ENGINE
1 RESPONDENT REPORTED 10 HRS ON THE LEFT ENGINE 20 HRS. ON THE RIGHT
1 RESPONDENT REPORTED 5 HRS ON THE LEFT 25 HRS. ON THE RIGHT ENGINE

1O AIRPLANES FLY EVERY WEEK TO 10 DAYS
2 OF THESE AIRPLANES WERE REPORTED TO SIT FOR EXTENDED PERIODS
1 SITS FOR ABOUT 6 MONTHS OUT OF THE YEAR
1 SITS FOR BETWEEN 6 MONTHS TO A YEAR AT A TIME WITHOUT BEING FLOWN

12 RESPONDENTS KEEP THERE AIRPLANES IN HANGARS IN THE COLD CLIMATES THREE HANGARS ARE NOT HEATED TWO OF THOSE AIRPLANES HAVE ENGINE HEAT. ONE DOES NOT HAVE ENGINE HEAT

ONE RESPONDENT IS HANGARED FOR ABOUT 6 MONTHS WHERE HUMIDITY IS A CONCERN. THE OTHER 6 MONTHS THE AIRPLANE IS OUTSIDE (CALIFORNIA)

START UP AND ENGINE WARM UP WERE REPORTED AS FOLLOWS

3 RESPONDENTS START AT 500-600 RPM WARM UP AT 800 RPM
1 RESPONDENT STARTS AT 600-700 RPM WARM UP AT 1000-1200
1 RESPONDENT STARTS AND WARMS UP AT 800 RPM
1 RESPONDENT STARTS AND WARMS UP AT 1000-1200 RPM
3 RESPONDENTS START AND WARM UP AT 1000 RPM.
1 RESPONDENT STARTS AND WARMS UP AT 1100 RPM
1 RESPONDENT STARTS AT 800 RPM AND WARMS UP AT 1000RPM
1 RESPONDENT STARTS AND WARMS UP AT 1200 RPM

DUKE ENGINE SURVEY RESULTS.

TOTAL SURVEY'S RECEIVED 23
OWNER'S WITH CAM /LIFTER PROBLEMS 11
OWNER'S WITHOUT CAM/LIFTER PROBLEMS 12

OWNERS THAT HAVE HAD CAM/LIFTER PROBLEMS

T.T. SINCE NEW		T.T. SINCE SMOH		START OF PROBLM		CALENDAR TIME SINCE O/H (YRS)		O/H SHOP	COND. AT O/H CAM	LFTR	CYL
LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT				
2300	2300	600	600	300	300	10	10	S.AFRICA	RGD	NEW	OLD
1450	1450	530	530	480	480	4	4	FWF	NEW	NEW	OLD
1290	1290	9	1290	1290	DNA	1	20	W. SKYWY	NEW	NEW	NEW
2221	2221	301	301	175	175	4	4	WESTSTR	RGD	NEW	NEW
1708	1946	265	265	105	105	2	2	FWF	NEW	NEW	NEW
3115	2176	1481	725	1481	725	?	6	L BLUPRT	?	?	?
								R FACT OH	NEW	NEW	NEW
2040	2940	318	417	150	DNA	6	8	FACT OH	NEW	NEW	NEW
?	?	148	148	NEAR TBO		2	2	FWF	NEW	NEW	NEW
915	532	915	532	915	DNA	15	10	FACT RM	NEW	NEW	NEW
850	850	850	850	850	850	?	?	FACT RBT	NEW	NEW	NEW
664	664	664	664	350	DNA	7	7	FACT RBT	NEW	NEW	NEW

FWF = FIREWALL FORWARD
RGD = REGROUND
W. SKYWY = WESTERN SKYWAYS
WESTR = WESTSTAR
BLUPRT = BLUEPRINT
FACT OH = FACTORY OVERHAUL
FACT RM = FACTORY REMAN
FACT RBT=FACTORY REBUILT

THREE OWNERS HAD PRIOR OVERHAULS GO TO TBO WITHOUT ANY CAM/LIFTER PROBLEMS.

ONE OWNER RAN HIS ENGINES 1900 HRS BEFORE OVERHAULING THEM . AT A 160 HOURS AFTER THE OVERHAUL BOTH ENGINES HAD TO HAVE NEW CAMS AND LIFTERS 35 HOURS LATER THEY WERE BOTH MAKING METAL AGAIN

ONE OWNER HAD TO REPLACE CAMS /LIFTERS 175 HOURS AFTER AN OVERHAUL ONLY TO HAVE CAM/LIFTER SPALLING 142 HOURS LATER.

QUESTION ON PRE-OILERS
4 OWNERS HAVE THEM ON THERE AIRPLANES
7 RESPONDENTS DO NOT HAVE THEM INSTALLED

INTERCOOLERS
4 OWNERS HAVE THEM
7 OWNERS DO NOT HAVE THEM

ENGINE HEATERS
6 OWNERS DO NOT HAVE THEM INSTALLED
5 OF THE 6 ARE LOCATED IN A WARM CLIMATE . THE OTHER AIRPLANE IS IN A VERY COLD CLIMATE BUT OPERATES OUT OF HEATED HANGAR.
5 HAVE ENGINE HEATERS INSTALLED AND USE THEM AS FOLLOWS:
1 RESPONDENT 24 HOURS BEFORE FLIGHT
1 RESPONDENT 12 HOURS BEFORE FLIGHT
1 RESPONDENT 8 HOURS BEFORE FLIGHT
2 RESPONDENTS 4 HOURS BEFORE FLIGHT.

NONE OF THE RESPONDENTS LEFT THEIR ENGINE HEATERS PLUGGED IN ALL THE TIME

HOW DID YOU FIRST FIND THE CAM LIFTER PROBLEM?

7 RESPONDENTS FIRST NOTICED METAL IN THE FILTER.
2 RESPONDENTS FIRST NOTICED A DROP IN OIL PRESSURE (APPROX 30PSI) WHICH WAS SOMETIMES INTERMITTANT. METAL CHIPS WERE FOUND IN THE OIL PUMP HOUSING
TWO OPERATORS HAD A LOSS OF POWER OR SURGING POWER FROM THE TURBOCHARGER, METAL CHIPS FOUND IN DENSITY CONTROLLER AND OR WASTEGATE
1 RESPONDENT FOUND THE PROBLEM BY INSPECTION OF LIFTERS AND CAM
1 RESPONDENT FOUND THE LIFT ON A CAM LOBE TO BE LOW WHILE CHANGING A PUSH ROD TUBE SEAL.

DO YOU INSPECT THE LIFTERS ON A PERIODIC BASIS?

9 RESPONDENTS DO NOT CHECK THERE LIFTER ON A PERIODIC BASIS
2 RESPONDENTS CHECK THE LIFTERS AT 100 HRS -200 HR INTERVAL

MAKE AND TYPE OF OIL USED
2 RESPONDENTS USED PHILLIPS XC 20W50
1 REPONDENT NO ANSWER
2 RESPONDENT USED AEROSHELL 15W50
2 RESPONDENTS USED AEROSHELL 100 W PLUS
1 RESPONDENT USED EXXON ELITE IN WINTER AEROSHELL 100W PLUS SUMMER
1 RESPONDENT USED EXXON ELITE
1 RESPONDENT USED AERSHELL 15W50 FIRST 650 HRS. NOW USES 100W PLUS
1 RESPONDENT USES AEROSHELL 100W PLUS OR AEROSHELL 80W

EVERYONE USED THE ADDITIVE IF REQUIRED
NO BODY MIXED BRANDS OF OIL

FREQUENCY OF OIL CHANGES

2 RESPONDENTS CHANGE OIL AT 35 HOUR INTERVALS
4 RESPONDENTS CHANGE OIL AT 25 HOUR INTERVALS
4 RESPONDENTS CHANGE OIL AT 50 HOUR INTERVALS
1 DIDN'T ANSWER THE QUESTION

OIL ANALYSIS

8 RESPONDENTS USE OIL ANALYSIS
3 RESPONDNETS DO NOT USE OIL ANALYSIS

DO YOU FEEL OIL ANALYSIS HELPED YOU FIND THE CAM/LIFTER PROBLEM

9 RESPONDENTS (SOME EMPHATICALLY) ANSWER NO
2 RESPONDENTS FAILED TO ANSWER THE QUESTION

ALL RESPONDENTS CUT THE OIL FILTER OPEN FOR INSPECTION

DID INSPECTING THE FILTER ALERTED YOU TO AN IMPENDING FAILURE?

5 RESPONDENTS SAID YES
5 RESPONDENTS SAID NO
1 DIDN'T ANSWER THE QUESTION

OTHER CONDITIONS THAT WERE FIRST NOTICED

THESE HAVE BEEN ADDRESED EARLIER SUCH AS LOW OIL PRESSURE SURGING TURBO, MANIFOLD PRESSURE BUT THERE WERE SEVERAL NOTES THAT OIL ANALYSIS WAS NO LONGER BEING USED FELT THAT IT WAS USELESS .

CALIBRATING TIT GAGES

3 RESPONDENTS DO NOT CALIBRATE THEM THEY USE A DIGITAL OR JPI SYSTEM
3 RESPONDENTS DO NOT CALIBRATE THEM OFTEN
2 RESPONDENTS CALIBRATE THE GAGES ANNUALLY
2 RESPONDENTS CALIBRATE ON A NEED BE BASIS
1 RESPONDENT DIDN'T ANSWER THE QUESTION

CURRENT MAINTENANCE FACILITIES
3 RESPONDENTS WERE WITH THERE MAINTENANCE FACILITIES LESS THAN THREE YEARS
2 RESPONDENTS HAVE BEEN WITH SAME FACILITY UP TO 10 YEARS
5 RESPONDENTS HAVE BEEN WITH THEIR FACILITY 10 YEARS OR BETTER.
1 RESPONDENT HAS BEEN WITH HIS MAINTENANCE FACILITY 25 YEARS.

ALL RESPONDENTS SAID THE ENGINES HAD PRODUCED NORMAL POWER UP TO THE TIME OF AN IMPENDING CAM LIFTER PROBLEM

LENGTH OF TIME IT TAKES FOR THE OIL TO TURN PITCH BLACK AFTER AN OIL CHANGE

3 RESPONDENTS 15 HOURS BOTH ENGINES
1 RESPONDENT 12 HOURS BOTH ENGINES
1 RESPONDENT 4-5 HOURS BOTH ENGINES
1 RESPONDENT LEFT ENGINE 5 HOURS RIGHT ENGINE 15 HOURS
1 RESPONDENT LEFT ENGINE 10 HOURS RIGHT ENGINE 3 HOURS
1 RESPONDENT LEFT ENGINE 10-12 HOURS RIGHT ENGINE 5-10 HOURS
3 RESPONDENTS DIDN'T ANSWER

ALL RESPONDENTS SEEM TO FLY THERE AIRPLANE AT LEAST ONCE A WEEK

ALL BUT ONE RESPONDENT KEEP THERE AIRPLANE IN A HANGAR. THOSE IN COLDER CLIMATES HAVE EITHER HEATED HANGARS OR ENGINE HEATERS

NO ONE REPORTED A HUMIDITY PROBLEM IN THERE HANGAR AND NO ONE LET THE AIRPLANE SIT FOR A LONG PERIOD OF TIME 3 WEEKS WAS PROBABLY THE MAX.

START UP AND ENGINE WARM UP RPM WERE REPORTED AS FOLLOWS
5 RESPONDENTS REPORT 1000RPM
4 RESPONDENTS REPORT 800-1000 RPM
1 RESPONDENT SAYS AS SLOW AS POSSIBLE
1 RESPONDENT SAYS 650 RPM 3-5 MINUTES DEP ON TEMP THEN 800-900 RPM FOR 15 MIN. UNTIL TEMP.AT 50 DEGREES C.

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 # _____