



NEWSLETTER

Carb Heat

Hot Air and Flying Rumours

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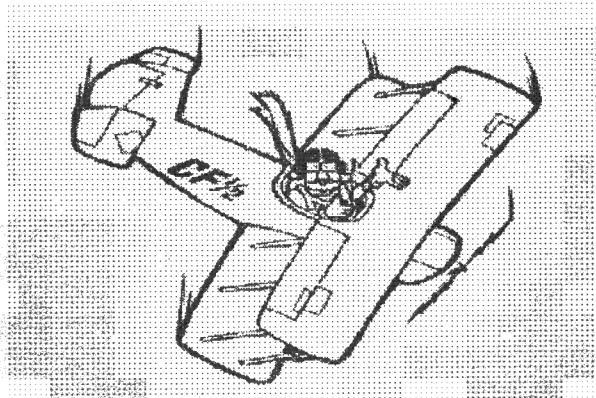
May 1996

**Next Meeting: Thursday 16th April 2000hrs
Bush Theatre
National Aviation Museum
Rockcliffe**

Program: - Regular monthly business
Guest Speaker: - Al Ludford on the construction of the "Air Beatle"
an RV-6 derived trainer for the Nigerian Airforce

Inside:
-Young Eagles Fly Day 8th June update - Lars Eif
-Stuck Valves - by John Schwaner (jschwaner@avweb.com)
-New Pilot Currency Requirements
-Calendar of events - Tom Smith

HANGAR RESHINGLING 25-26 MAY WEEKEND- see back page



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The first weekend of May is finally starting to look more like spring, and most of the active pilots have started their flying season. Ken and Trish MacKenzie have returned from the sunny south, and hopefully Ken will have another tale or two to tell about flying in the land of the free, and tax challenged to our south.

It was nice to see Andrew Depippo show up with his CH-701 ready for final assembly. Andrew is rushing to add this new bird to his nest before his wife delivers their third child. I don't know how he is going to find any time to fly, but it is sure good to see more homebuilts nearing completion.

Also progressing nicely is Stan Ironstone on his Glasair III. Luc and I flew to Smith Falls this morning and got to see the wing and fuselage finally mated. For Glasair builders, that is a key milestone, and Stan can finally see the welcome light at the end of the tunnel. As with most of our members, Stan is doing a first class job, to complement a first class kit.

I know we repeat the request often, but it sure would be nice to see some more articles contributed by members. Andy Douma, our intrepid newsletter editor will accept your input in any form. If I can churn out this column month after month, surely some of you can put your thoughts together recounting a memorable or nostalgic moment, or passing on a neat technique you've come across in your homebuilding efforts. Don't be shy, Andy loves to exercise his editorial skills to turn your inputs into Pulitzer prize material.

Work Parties:

Dick Moore, our tireless Operations manager is planning a major work party this spring to put a new roof on the hangar in addition to the normal spring cleanup. I am sure I can count on all of you to pitch in when Dick calls around.

Several of our members have pitched in with time and materials this winter. At the risk of forgetting some, I would like to thank Irving Slone for donating two door closers; Peter Plaunt for donating a biological toilet that we plan to locate inside the hanger, as well as some tools for our machine shop; and Ron Eberts for donating tools for the machine shop. Well done and thanks on behalf of the club.

Upcoming Events:

June 8th: Young Eagles day, contact Lars Eif if you want to volunteer.

June 28-29: National Capital Airshow homebuilt display, contact Luc DeSadeleer if you want to participate.

July 1st: National Aviation Museum static and flying display. Contact Gary Palmer if you can display your homebuilt or classic bird.

Charlie Hillard:

As some of you may have heard, Charlie Hillard, the former lead pilot of the Eagles aerobatic team was killed in a freak accident at Sun n Fun. Charlie had completed his air show in his Hawker Sea Fury when the aircraft departed the runway on landing. Some reports suggested a possible locked brake as Charlie was battling a stiff 15 knot, 90 degree crosswind. As the Sea Fury left the runway it nosed over and Charlie suffered fatal

injuries due to the lack of a rollover structure to protect him. Coupled with the loss a couple of months ago of Robert Overmeyer, a NASA astronaut while flight testing the Cirrus VK30, we have lost a couple of Sport Aviation's best ambassadors. Our thoughts go to their families, and I hope we are all reminded that safety should be job one in all our flying activities. Continue to fly safely, friends.

April Highlights:

Our April meeting saw an excellent turnout for two top notch educational videos from Boeing, courtesy of one of our newest members, Ron Eberts. I was particularly impressed by the efforts made to ensure that all aircraft skins remained absolutely scratch free.

Carp Airport Status

I wish I had more concrete information to report on the status of the Carp airport transfer to the region, but it seems that environmental issues are not yet sorted out. The good news is that our Young Eagles day on June 8th is OK. The bad news is that excessive delays in starting construction may mean the loss of our fly-in breakfast this year.

May. 16th Mtg. at NAM:

Our next meeting is being held Thursday May. 16th at our usual Bush Theatre location, 8:00 PM sharp. **Al Ludford** will share his experiences supervising the construction of the Air Beetle in Nigeria. The Air Beetle is a custom version of the RV-6 used as the ab-initio trainer for the Nigerian Air Force. Hope to see you there.

Gary 



YOUNG EAGLES FLIGHT RALLY

STILL TIME TO VOLUNTEER AND TO RESERVE FLIGHT TIMES

As mentioned in the April newsletter, the Young Eagles International Flight Rally is "Go for launch!" on Saturday, June 8, 1996 at our Chapter Hangar at Carp Airport.

At the April meeting, several pilots and ground crew signed up to help. Thanks, fellows! We can still use more of both ground crew and pilots with aircraft, so if you haven't yet volunteered, please see Lars Eif at the May meeting or call me at 837-6680. If there is no answer, please leave a recorded message.

There are still about twenty slots available for Young Eagles. Any young person between 8 and 17 years of age inclusive who has not already taken a Young Eagles flight is eligible. Offer them either the 9:00 am or the 12:30 pm session. Reserve slots at the May meeting or call the Young Eagles Hotline at 837-6680.

The 50/50 draws are very well supported thanks to the generous donations of our meetin' goin' members.

If the weather co-operates, we're going to have a really enjoyable day on June 8th!

Lars Eif, Young Eagles Co-Ordinator



Dealing With Stuck Valves

If your engine seems rough when first started, it might be giving you an early warning of a stuck valve. Failure to heed this warning and correct the situation promptly could cost you an engine teardown, or even result in a catastrophic engine failure and a forced landing. Here's the lowdown on why valves stick and what to do about it.

by John Schwaner
(jschwaner@avweb.com)

Each cylinder of your piston aircraft engine has two valves--intake and exhaust--that open and close by sliding in and out through a close-tolerance valve guide. A stuck valve is one that no longer slides readily in its guide. A stuck valve may refuse to open, or once open it may refuse to close. Either situation is quite serious.

Stuck valves are usually caused by a build-up of deposits and/or corrosion on the valve stem. Because the fit of the stem in the guide is so snug, it doesn't take much build-up on the valve stem to interfere with free movement of the valve within the guide.

"Morning sickness"

The clearance between the valve stem and its valve guide are at a minimum when the engine is cold. Consequently, the first sign of a stuck valve usually occurs when the engine is first started, and is often identified by an intermittent hesitation, or miss, in engine speed. We call this "morning sickness".

Morning sickness is a warning that should be heeded immediately. Sticky valves never get better by themselves...they always get worse, usually fairly quickly. Flying an airplane whose engine exhibits morning sickness increases the risk of serious engine damage and possibly in-flight engine failure. Hence, the aircraft should be downed for maintenance at the first hint of valve sticking.

What makes valves stick?

Valve sticking is influenced both by the design of the engine and the environment in which it is operated. Lycomings have more valve sticking problem than Continentals. Hot-running engines stick valves more often than cool-running ones. Valves are more likely to stick in hot summer weather than in cold winter months. The use of heavily-leaded fuels and inadequate leaning can lead to valve sticking, as can infrequent oil changes.

Heat is the primary cause of valve sticking. High temperatures in the exhaust valve guide oxidizes oil and forms carbon deposits on the valve guide, and these deposits can cause the valve to stick. The most frequent reason for elevated valve temperatures is valve leakage.

All of the combustion gas must pass around the valve face as it goes out the exhaust port. The large heat-absorbing surface of the exhaust valve face must conduct heat away from its surface. A valve that is not contacting its seat properly (i.e., is leaking) cannot conduct as much heat into the cylinder head as a valve with good seating.

Sticky Lycomings

Lycoming valve stems operate at higher temperatures than Continental valves stems. Continental engines use solid exhaust valves whereas Lycoming engines use sodium-cooled exhaust valves, which have hollow stems filled with metallic elemental sodium. The sodium in the

Lycoming valve melts at 97.5°C and conducts heat from the valve head into the valve stem, where it is conducted through the valve guide into the cylinder head. The Lycoming valve stem normally operates 100°F hotter than the Continental valve stem. The higher valve stem temperatures in Lycomings make them more susceptible to valve sticking. Most of the heat conducted from the head of the Lycoming exhaust [Image] valve goes out through the valve stem into the cylinder head fins. In addition, the Lycoming guide boss allows 5% of the guide to extend past the end of the boss and protrude into the exhaust port. The protruding guide absorbs heat from the flow of exhaust gas. Because of the high temperatures and combustion deposits on the exhaust valve stem, this area of the guide "bell mouths" or gets bigger. This increases the clearance between the guide and the stem and allows combustion products and heat to travel up the valve stem. These combustion products create lead deposits and acids which increase the corrosive environment. Lycoming valves also stick because of corrosion buildup on the valve stem. Corrosion increases the diameter of the valve, thereby reducing the valve stem-to-guide clearance. The high stem temperatures, combined with a design which allows more combustion products into the guide bore, create a corrosive environment which is seldom seen on Continental engines. Lycoming TIO-541 engines installed in the Beechcraft Duke use an oil-cooled exhaust guide. Cooling oil circulates in a groove between the exhaust guide and the guide boss. If this groove cokes up with oxidized oil and becomes blocked, the exhaust guide and valve overheat and stick. If you have a stuck exhaust guide on this engine, be sure

to check the oil passage by blowing compressed air through the oil fitting in the cylinder head.

Continental engine design is more resistant to valve sticking. Big-bore Continentals rarely stick valves. We do see a tendency for intake valves to stick on Continental engines in the O-200, O-300 series. A stuck intake valve disrupts the breathing of the entire induction system. The power loss results in a forced landing.

Engine operating environment
Environmental influences that create valve sticking are: high temperatures, dirty oil, high-lead fuels, hot engine shut-downs, and poor engine baffling. Improper leaning can also be a culprit: an engine that is run excessively rich will build up carbon, lead, and other combustion-related deposits on exhaust valve stems more quickly. On the other hand, an engine that is leaned excessively during high-power operation will experience high valve temperatures, and this contributes to valve sticking. Engine overhaul shops can't do much to prevent valve sticking. They cannot change the engineering of the engine, and have little control over its operating environment. About all they can do is to use the correct parts (valves, guides, seats, rotators, etc.), to dimensionally match the parts carefully, and to control the surface finish of the guide by careful reaming and honing.

Your regular maintenance shop can influence the operating environment by checking the engine's health regularly (via compression checks, oil analysis, filter inspection, etc.), by making sure the cooling baffles are in good shape and the magneto timing is correct, and by changing the oil frequently.

What happens when a valve sticks? When an engine has a stuck valve, one of five things can happen, each of which is bad news:

1. The pushrod bends.
2. The surface of the camshaft or cam follower fails
3. The valve opens but won't close
4. The rocker support breaks.
5. The valve rotator cap falls off the end of the valve stem. (Lycomings only.)

A valve that sticks closed will often result in serious and costly [Image] engine damage. Each time the cam-tappet-pushrod-rocker try to open that stuck valve, you risk catastrophic engine damage. With a stuck valve, the valve doesn't want to move. Tremendous valve train forces develop as the camshaft lobe tries to force the valve open. The camshaft follower and lobe are the most highly-stressed components of the engine even under normal conditions...the additional loading caused by a stuck valve may induce catastrophic failure of the rocker support, pushrod, cam follower, or cam lobe.

A damaged camshaft lobe requires complete engine removal and teardown. The same is true of a damaged cam follower if it is the mushroom-head variety used in many Lycoming engines. Sometimes an exhaust valve that is stuck closed can cause the intake pushrod to bend or the intake rocker support boss to break. How can this happen? If the exhaust valve sticks closed, exhaust gases will not exit from the cylinder. Gas pressure within the cylinder then prevents the intake valve from opening. If this happens, something's gotta give. Either the pushrod bends or the rocker support breaks.

You might think that a valve that sticks open is a much less serious situation, but that's not necessarily so. If the valve is an intake valve, you lose power and will need to make a forced landing. If the valve is an exhaust valve, there will not be any compression on that cylinder. In either case, if the valve spring can't close the valve, the entire valve

train (cam follower, pushrod, and rocker arm) unloads. The end of the pushrod that rests in the socket in the cam follower may come out of the socket and fling around inside the tappet boss. If the pushrod ball does not locate itself back into the socket when the cam lobe comes around, it may jam against the tappet housing, usually causing crankcase damage.

The valve rotator cap on Lycoming engines is kept on the tip of the exhaust valve stem by the rocker arm. If the valve sticks open, the rocker may move far enough away to allow the rotator cap to fall off the valve stem tip. When this happens, not only is valve clearance excessive, but also the rocker face pounds into the spring seat. The rotator cap is too big to fall down the pushrod tubes. It just lays in the rocker box until you take the rocker box off. It then quietly falls unnoticed onto the hangar floor. If you notice a missing rotator cap, it is likely that the exhaust valve was stuck open in the past. Look in the rocker box or around the hangar floor and you might find it.

Engine damage does not always occur when the valve sticks, but the longer the engine operates in this condition, the greater the chances are that some damage will occur. Remedial action

Repairing a stuck valve can be done without removing the cylinder from the engine. The procedure is described in Lycoming Service Instruction 1425 and consists of dropping the valve into the combustion chamber, reaming the guide, and then reinstalling the valve.

Another method is to tie dental floss to the end of the exhaust valve and lower it down into the cylinder. Ream the guide and then pull the valve back up into the guide. If it's necessary to remove the cylinder, we recommend you inspect the condition of the camshaft lobes

and the cam follower. You may want to review the operating environment of the engine. Pay particular attention to the oil change intervals, baffle condition, and operating techniques.

The procedure outlined in Lycoming Service Instruction 1425 and described here can also be used on Continental engines.

Do not use Marvel Mystery Oil or other solvents to un-stick a valve. Solvents may un-stick the valve in time but not immediately.

Eventually the valve may un-stick, but not before your camshaft lobes have been damaged.

Solvent treatments dissolve the outer deposit layers in the guide boss and temporarily un-stick the valve. The remaining deposits push the valve over to the opposite side of the guide and cause rapid, uneven guide wear. The valve stem may stick or it may cause rapid guide wear where the stem is forced against the guide material opposite of the deposit buildup.

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John Schwaner is AVweb's powerplant expert. John is a world-class authority on piston aircraft engines, and a specialist in the engineering analysis of engine failures. John runs Sacramento Sky Ranch, Inc., a leading distributor of aircraft and engine parts, and probably the foremost aircraft hose shop and magneto overhaul facility in the U.S. John and his wife live in Sacramento, California.

John has also written two superb technical books: Sky Ranch Engineering Manual and The Magneto Ignition System. Both can be previewed in and ordered from the AVweb Online Bookstore. Editor-in-Chief: Mike Busch editor@avweb.com Publisher: Carl Marbach publisher@avweb.com

This page was last updated Monday, February 05 1996

Pilot Currency Requirements

Effective June 1996

The five-year recency requirement has been in place for a few years but the two-year requirement is an upgrade that will be enacted with the new Canadian Aviation Regulations, currently scheduled for implementation in June 1996. A phase-in procedure for the new requirements will be outlined in Aeronautical Information circulars and will be published in COPA's monthly Canadian Flights newspaper.

FIVE-YEAR REQUIREMENT

CARS 401.05

(1) No holders of a Canadian flight crew permit, licence or rating shall exercise the privileges of the permit, licence or rating unless:

(a) the holder has acted as pilot-in-command or co-pilot of an aircraft within the five years preceding the flight, or

(b) within the 12 months preceding the flight

(i) the holder has completed a flight review, in accordance with the personnel licensing standards, conducted by the holder of a flight instructor rating for the same category of aircraft;

(ii) the flight instructor who conducted the flight review has certified in the holder's personal log that the holder meets the skill requirements for issuance of the permit or license set out in the personnel licensing standards; and

(iii) the holder has successfully completed the appropriate

examination specified in the personnel licensing standards. (See "Recurrent Training" below.)

TWO-YEAR REQUIREMENT

(2) No holder of a flight crew permit or licence, other than a pilot licence - glider, shall exercise the privileges of the permit or licence unless the holder has

(a) successfully completed a recurrent training program in accordance with the personnel licensing standards (see "Recurrent Training" below) within the 24 months preceding the flight; and

(b) where a passenger, other than a flight test examiner designated by the Minister, is carried on board the aircraft, completed at least five takeoffs and five landings in the same category and class of aircraft within six months preceding the flight

by day or night, if the flight is conducted wholly by day, or

by night, if the flight is conducted wholly or partly by night.

RECURRENT TRAINING

(CARS 421.05)

(1) To comply with the requirements of . 401.05(1)(b) [the five-year requirement]:

(a) the flight review shall include all items normally covered during the flight test for the issue of that permit or licence,

(b & d) the instructor completing the flight review shall certify in the holder's log book, "This is to certify that the skill requirement for (permit or licence) has been met. Include the date and the name, signature and licence number of the instructor.

© the holder shall successfully complete the the written examination (PSTAR) for "Student Pilot Permit or Private Pilot Licence for Foreign and Military - Applicants, Air Regulations".

(2) In order to comply with the currency requirements of 401.05 (2)(a), any of the the following are considered acceptable as recurrent training programs

(a) completion of a flight review conduct- ed by the holder of a flight instructor rating in the same category, including normal and emergency procedures and manoeuvres;

(b) attendance at a safety seminar conducted by Transport Canada Aviation;

© participation in a recurrent training program approved by the Minister which is designed to update pilot knowledge of human factors, meteorology, flight planning and navigation, and aviation regulations, rules and procedures;

(d) completion of self-paced study program produced annually in the Transport Canada Aviation Safety Newsletter, which is designed to update pilot knowledge in subjects specified in © above. The completed copy shall be the most current published by date and shall be retained by the licence holders;

(e) completion of a mandatory training program of Pilot Proficiency Check as required by other Parts of the CARS;

(f) completion of the requirements for the issue or renewal of a pilot permit, licence or rating, including night, instrument, multi- engine, flight instructor, landplane or sea- plane; or

(g) completion of the written examination for a permit, licence or rating.

AVIATION EVENTS CALENDAR

by TOM SMITH 30-Apr-96

MAY. 16/THU EAA meeting ROCKCLIFFE MUSEUM 19:30 hrs
 MAY. 21/TUE RAA meeting KINGSTON 19:30 hrs
 MAY. 26/SUN EMBRUN BREAKFAST
 MAY. 26/SUN IFF ST.LOV UPPER CAN.GOLF BRUNCH 12:30

JUN. 2/SUN SMITHSFALLS BREAKFAST
 JUN. 6/THUR EMBRUN AERO CLUB MEETING 19:30hrs
 JUN. 9/SUN COBDEN BREAKFAST(1)
 JUN. 9/SUN ST LAZARE BREAKFAST(2)
 JUN. 16/SUN CORNWALL BREAKFAST
 JUN. 16/SUN IFF ST.LOV BEARBROOK INTL.FLYIN NOON

JUN.18/TUE RAA meeting BROCKVILLE 19:30 hrs
JUN.20/THUR EAA meeting ROCKCLIFFE MUSEUM 19:30 hrs
JUN.22-23 YOW AIR SHOW
JUN.23/SUN EAA MASSENA BREAKFAST CUSTOM ON FIELD(MUST)
JUN.28/SUN PIPER AIRCRAFT SENTIMENTAL JOURNEY LOCKHAVEN P.A.
JUN.29/SUN RAA SHERBROOKE (camping)

JUL. 1/MON?? ROCKCLIFFE
JUL. 2/THUR EMBRUN AERO CLUB MEETING 19:30hrs
JUL. 7/SUN IFF ST.LOV CARRÔs Cottage.FLYIN NOON landUPPER CAN.
JUL. 6 OR 7 99Ôs OLD RHINEBECK
JUL.13-14 IFF ST.LOV OLD RHINEBECK CAMP OVER???
JUL.16/TUE RAA meeting SMITHSFALLS 19:30 hrs
JUL.18/THUR EAA meeting ROCKCLIFFE MUSEUM 19:30 hrs
JUL.21SUN IROQUOIS BREAKFAST (& CAMP OVER SAT.NIGHT)

AUG. 1/THUR EMBRUN AERO CLUB MEETING 19:30hrs
AUG. 1-7 OSHKOSH
AUG 10-11 STANHOPE (CAMPOUT-BBQ)
AUG.11/SUN
AUG.11/SUN EAA CARP BREAKFAST ???????
AUG.15/THU EAA meeting ROCKCLIFFE MUSEUM 19:30 hrs
AUG.18/SUN ALEXANDRIA BREAKFAST
AUG.20/TUE RAA meeting KINGSTON 19:30 hrs
AUG.24/SAT IFF ST.LOV CORN ROAST & CAMP OVER IROQUOIS
AUG.31/SAT? PEI TOM SMITH ANNUAL TRIP (JOIN US)

SEP. 5/THUR EMBRUN AERO CLUB MEETING 19:30hrs
SEP. 8/SUN STIRLING CORN ROAT
SEP.13-15 COPA HUNTSVILLE DEERHURST RESORT
SEP.15/SUN IFF N.Y.CORN ROAST.FLYIN MIDDESEX N.Y.
SEP.17/TUE RAA meeting BROCKVILLE 19:30 hrs
SEP.19/THUR EAA meeting ROCKCLIFFE MUSEUM 19:30 hrs
SEP.20-22 IFF ONT CONVENTION CHATHAM ONT.
SEP.28/SAT STANHOPE BRUNCH 9 till 3

OCT.???? IFF ST LOV PALMER RAPIDS
OCT. 3/THUR EMBRUN AERO CLUB MEETING 19:30hrs
OCT.12/SAT IFF N.Y. PICNIC FRANCONIA N.Y.
OCT.15/TUE RAA meeting SMITHSFALLS 19:30 hrs
OCT.17/THUR EAA meeting ROCKCLIFFE MUSEUM 19:30 hrs

NOV. 7/THUR EMBRUN AERO CLUB MEETING 19:30hrs
NOV.19/TUE RAA meeting KINGSTON 19:30 hrs
NOV.21/THUR EAA meeting ROCKCLIFFE MUSEUM 19:30 hrs
NOV.21/THUR EAA meeting ROCKCLIFFE MUSEUM 19:30 hrs

DEC. 5/THUR EMBRUN AERO CLUB MEETING 19:30hrs
DEC. 7/SAT EMBRUN AERO CLUB CHRISTMAS PARTY
DEC.16/TUE RAA meeting BROCKVILLE 19:30 hrs
DEC.19/THUR EAA NO MEETING IN DEC.!!!!

CLASSIFIEDS

6 May 96

PLEASE NOTE:

**ADS DEADLINE IS THE
1st OF THE MONTH**

**PLACE YOUR ADS BY
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Classifieds Editor**

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gallons clear;**

**1 gallon Piper Lockhaven yellow
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**- Oil cooler Continental 6cyl
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Jim Robinson 830-4317
 10/95

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WORLD OF MAPS

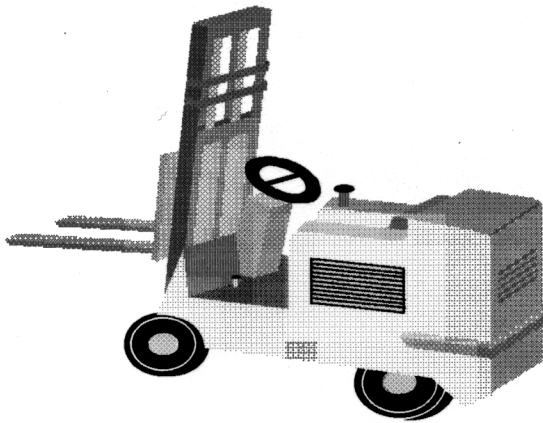
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AVIATION ART

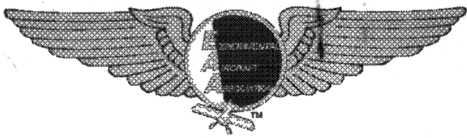
CREATIVE CUSTOM FRAMING

NUTHATCH ENTERPRISES

Custom picture faming, very large catalogue of Aviation Art
 19 Westfield Cres., Nepean
596-2715 call for appointment



NOTICE: We are planning to reshingle the hangar roof on the May 25-26 weekend. Any assistance would be greatly appreciated. Phone Dick Moore at 836-5554 to offer your help. Thank You



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