



# DESIGNEE NEWSLETTER

## THE PUBLICATION OF THE EAA DESIGNEE PROGRAM



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The *DESIGNEE NEWSLETTER* is a forum for the exchange of information and ideas of interest to aircraft and ultralight builders, restorers, and flyers. The sources of the materials published are EAA Designees, readers, Chapter newsletters, and other publications. Readers are encouraged to submit manuscripts, drawings, and black/white photos for consideration. Every effort is made to select accurate materials of interest to a majority of readers. Opinions expressed and responsibility for accuracy rests entirely with the contributor. All materials submitted become the property of EAA - no remuneration will be made. Materials should be sent to Chuck Larsen, EAA Designee Director.

### EAA AIR ACADEMY '85

EAA Air Academy '85 will bring 50 enthusiastic, aviation oriented youth to the EAA Aviation Center in Oshkosh, Wisconsin to enjoy sport aviation at its best. More than two weeks of activity will include aviation history, fabrication and the aviation extravaganza that is OSHKOSH '85.

The December issue of *SPORT AVIATION* contained details of this new and exciting program possible only at the EAA Aviation Center. If you have or know of interested youth, contact EAA Headquarters for information and registration materials.

We are also seeking qualified volunteer instructors experienced with aircraft and benefactors to donate materials and supplies as well as scholarships for participants in EAA Air Academy '85.

Contributions to this EAA Aviation Foundation activity are tax deductible under IRS Code 170.

Contact Chuck Larsen at EAA Headquarters for further information and application materials.



### EAA'S OSHKOSH ADDRESS

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### DESIGNEES AND SUBSCRIBERS:

A white blanket of snow covers the convention site and grounds of the EAA Aviation Center. The earth sleeps but EAA's workshop and offices buzz with activity. I'm sure EAAer's shops are also busy building, restoring, preparing for the future. For some the goal is for the coming spring . . . and others dreams are further into the future. Whoever . . . wherever we continue to share and realize man's dream of personal flight.

The aircraft activities in their workshops are the subjects of this publication. Shop tools, techniques, problems, solutions, hints and kinks or just ideas and comments are requested from your mind and shop to fill these pages. The *DESIGNEE NEWSLETTER* can be only as good as the materials you provide for publication. Take some time to share your knowledge by writing an article for this, your publication. Articles from a brief comment to as long as three double-spaced, typewritten pages will be considered. Finished drawings (not sketches) and/or clean black-and-white photos illustrating your article will add a great deal to the story. Please send articles to my attention at EAA Headquarters.

Chuck Larsen, Designee Director

### THE EAA DESIGNEE PROGRAM

Designees are appointed based on their experience with aircraft repair and/or construction of homebuilt aircraft and the recommendations of their Chapter. A complete explanation of the program and applications for appointment as an EAA Designee can be secured by Chapters from the Chapter/Designee Office at Headquarters.

These selfless individuals of the EAA fraternity assist builders in preparing their project for the required FAA inspection. Designees efforts are recognized by the FAA as being responsible, in great measure, for the quality of workmanship in homebuilts as well as decreasing the workload of FAA inspectors by reducing the necessity of return inspections. The Designee acts as an advisor only and can in no way assume the FAA's responsibilities relating to aircraft inspection, approval or licensing. The Designee is a volunteer advisor, normally selected by a Chapter, who offers his or her expertise by providing guidance in the selection and construction or restoration of fellow EAAer's projects. Designees provide technical assistance and help the builder/restorer evaluate their accomplishments. They also disseminate information to their Chapter from publications including the *EAA DESIGNEE NEWSLETTER*, a monthly publication from EAA Headquarters which contains aircraft building and safety information. This publication is also available, by subscription to EAA members, for \$10.00 per year.

# LETTERS 'N SHOP TALK



## ENGINE HEATER/STAND

From Jay Schrage, EAA 180338, Route 1, Box 29A, Allison, IA 50602

Flying out of a small grass field in northeastern Iowa during the winter months surely has its trials. I am always amazed at the makeshift and unhandy ways the fixed based operators pre-heat their airplanes. It seems to me even the models in the aircraft supply catalogs aren't designed very well, so I set out to make my own.

A 50,000 BTU space heater that burns kerosene is attached to a frame on wheels. All parts were salvaged from old farm machinery. Large semipneumatic tires from a mower roll easy on frozen turf and snow. The flexible grain spout will allow the blast of heat to be directed in any direction desired. A piece of conveyer belting was attached to the end to protect the aircraft finish. Small turnbuckles keep the heater in position and also allow for a quick disconnect. This way I can easily put the heater in the trunk of the car at the airport and take it back to my farm for other uses.

Four or five minutes is plenty of time to preheat my Cherokee 180 on a 0 degree day. I have found that by opening the heater-defroster some of the heat will even get to the cabin area. One cold January morning a 172 pilot was preflighting his airplane with all the windows frosted over, so we opened the cabin door and aimed the heat inside. Ten minutes later he was on his way with both a warm engine and cabin.



## HINTS FOR EXCESSIVE OIL CONSUMPTION

From the CARMEL VALLEY UPDRAFT, published by EAA Chapter 204

Check exhaust system outlets for oily deposits.

Check for broken or unseated rings — excessive oil emission at the engine breather outlet would indicate this condition.

Check valve guides to valve stems for excessive clearance.

Check for a dirty air induction system. This condition indicates unfiltered air and could result in worn and feathered piston rings and scuffed cylinder bores.

Apply a differential compression check in order to isolate piston ring leakage from unseated valves.

## 5052-0 ALUMINUM TUBE PROBLEMS

A member reports he has had a great deal of trouble obtaining the proper tube to use for brake and landing gear retract systems. He has ordered some from a homebuilts supplier and a local Cessna dealer, and found instead of the 5052-0 that it is a very brittle tube that split when he tried to flare it. This tubing is supposed to be seamless, but he sees that it is seamed tubing on close inspection with a magnifying glass. He has, so far, been unable to find a reliable source of 1/4" aluminum tube in the soft condition. It might be a good idea to advise builders that tubing other than the 5052-0 may be supplied by some suppliers, in error.

Ben Owen, EAA Information Services

## HELPFUL HINTS WORKING WITH EPOXY

From Fred Wegner, EAA 121506, Designee 1262 of Des Moines, Iowa, Chapter 135

I had developed an allergy working with epoxy and fiberglass using hand coatings, etc. but I learned the safest and cleanest way to deal with epoxy was to first put JoGo hand cleaner on my hands, then put on medium weight vinyl gloves. The JoGo or glycerine made the gloves go on very easily and feel as if I didn't have gloves on. Also, if the gloves developed a hole in them, the epoxy didn't stick to my hands.

After job completion, the gloves slid off very easily and most of the time I was able to reuse the gloves.

All that was necessary for clean up was to wipe my hands with a paper towel or wash with soap and water.

## AIRCRAFT GROUND OPERATIONS

From the Chapter 318 Newsletter

Learning to taxi an aircraft on the ground is one of the first operations a student pilot is taught during training. Apparently the old cliché "First learned and soon forgot" holds true with pilots too, because a surprising number of accidents or incidents occur annually during taxi operations.

Taxiing appears to be such an elementary operation that pilots become complacent and inattentive to ground control of the aircraft. Operating on the ground during higher than normal or gusty wind conditions or in close proximity to large and turbine-powered aircraft can be particularly hazardous for small general aviation aircraft. Taxiing off the side of runways and taxiways, running into potholes, striking runway marker lights or reflectors, etc. . . usually cause damage to landing gear and propellers, and may also result in an upset of the aircraft. Collision with other taxiing or parking (parked) aircraft happen all too often. Explaining such mishaps to the investigating authorities and to the insurance company can be embarrassing to a pilot because there is seldom an acceptable excuse for having a taxi accident.

### Stay Alert While Taxiing

1. Taxi SLOWLY.
2. Check your brakes before moving more than the length of the aircraft.
3. Taxi Cautiously.
4. Keep a sharp lookout outside of the cockpit. This is not the time to be studying maps.
5. Taxi cautiously.
6. If the clearance between objects looks too narrow, it probably is. STOP. Shut down and take a look or have someone on the ground guide you through. Always have a guide on the ground to assist you when it is necessary to taxi in congested areas.
7. Taxi Cautiously.
8. Avoid taxiing behind or too closely to large and turbine-powered aircraft and be careful while taxiing under high wind or gusty wind conditions.
9. Taxi Cautiously.

## "DIRT DOBBERS" STRIKE AGAIN

Chuck:

While majoring my A-65, I ran across a potentially dangerous and costly situation. This especially applies to builders in the south.

After cleaning and dye-checking the main case, I set the case on top of my work bench. A week later when I started to install the camshaft and crankshaft I noticed three of my oil port passages plugged with mud. On closer examination and inspection I discovered that "dirt dobbers" (a hornet like insect) had used the oil passages to build nests.

Needless to say, I had to reclean the case. Had I not noticed the nests, I would have probably ruined the engine and possibly worse.

Next time after cleaning, I'll put all parts in a plastic garbage bag until assembly. "Nuff said, you all!"

Jack Hickey  
Designee 478  
Carrabelle, FL 32322

# TECHNICAL TOPICS

## FLYING YOUR ENGINE

From materials distributed by SPECTRO, Inc., Box 16526, Ft. Worth, TX 76133

Following are some do's and don'ts for operation of reciprocating aircraft engines that will reduce engine problems and enhance engine longevity and aircraft safety:

**GROUND RUNNING:** Modern aircraft engines need air flow for proper cooling. Avoid long ground runs. ALWAYS fully open cowl flaps for ALL ground operations. NEVER warm up with cowl flaps closed.

**AIR SPEED IN CLIMB:** Climb at less than recommended air speed results in inadequate air flow over the engine, hot spots and excessive wear. Many pilots use a climb IAS of a few knots above the book recommended number. A little loss in rate of climb is made up in miles gained — and the engine likes it better.

**THROTTLE MOVEMENTS:** Rapid throttle movement, on the ground or in the air, will cause different parts of the engine to expand and contract at different rates as engine temperatures change and cause binding and twisting resulting in excessive wear each time it is done. Throttle chopping is a prime cause of cylinder head cracking and other engine problems. Always use smooth throttle movements.

**LETDOWNS:** Over cooling the engine during descent results in lead fouling and excessive wear. Lean for smooth engine operation during descent. The ideal descent from cruise altitude is to reduce manifold pressure two or three inches and descend at about 300 RPM. Trim slightly nose down and let the air speed build up only slightly. A good rule of thumb to calculate start of letdown point is: Six percent (x .06) of ground speed for each 1,000 feet of altitude to be lost gives the distance from destination to begin, i.e., 150 GS x .06 = 9 miles x 5,000 feet (cruise altitude above traffic altitude) = 45 miles. Begin descent 45 miles from destination. Keep the engine warm — NEVER let the propeller turn the engine.

**COWL FLAPS:** Leave the cowl flaps CLOSED during letdown and approach. If you must go around the engine will be warmer to take power. Most engines will not overheat unless climb is extended, then there is plenty of time to open the cowl flaps.

**MIXTURE CONTROL:** Prolonged excessively lean mixture at cruise power will eventually burn exhaust valves and pistons. In extreme cases it can cause detonation resulting in piston collapse or cylinder head failure. Rich mixture contributes to plug fouling, carboning and ring and valve sticking. Follow the handbook instructions for your aircraft and engine.

**IDLE MIXTURE:** Maladjusted idle mixture can cause a host of engine problems, fouled spark plugs, sticking valves, burned valves, stuck piston rings, carboned pistons and cylinder heads, blackening of oil and even wheel brake problems — if you kick up the RPM a little during taxi to prevent plug fouling. Idle mixture is easy to check — see CHECKING IDLE MIXTURE under maintenance tips.

**CARBURETORS:** Improper carburetor calibration has on occasion been found to be the culprit causing excessive engine wear. Keeping track of fuel consumption is one way a pilot can detect this potential problem.

**SOOT IN EXHAUST STACK:** Occasionally swipe your finger inside the exhaust stack. Excessive or increasing soot buildup indicates ring blowby and trouble down the road.

**COLD WEATHER STARTS:** Oil is partially congealed and slow to begin circulation. Care must be exercised in use of power until the engine has begun to warm and oil pressure has stabilized. Heavy priming will wash oil from the cylinder walls and result in excessive wear — not to mention the fire hazard.

**INACTIVE ENGINES:** Engines that are used regularly last longer. If you cannot fly regularly turn the engine over (by hand or starter) at least every two weeks. Short ground runs only add to internal corrosion since oil must be brought to operating temperature to boil out the water and acids. Engines expected to be inactive a month or more should be "picketed" in accordance with the manufacturers instructions.

**LISTEN TO YOUR ENGINE:** Engines can talk — if you will listen! Be alert for gradual changes in engine sounds, oil consumption, fuel consumption, changes in temperatures and pressures. The engine just might be trying to tell you something. Engine failures without warning signals are extremely rare.

**COMPRESSION TEST:** The differential compression test is designed to check whether a cylinder may be leaking by the piston rings, exhaust valve or the intake valve. If there is a compression loss listen to the crank case vent, exhaust stack and carburetor intake to find where the cylinder is losing pressure. A good pressure indication may not be conclusive. Rocking the propeller back and forth VERY SLIGHTLY while pressure is on the cylinder will show a pressure fluctuation if piston ring lands are worn.

**BORESCOPE:** A carefully conducted borescope look in the cylinders will often reveal the cylinder causing excess wear when a compression check will not reveal the problem cylinder. Another method sometimes used to find a problem cylinder is to insert a mechanics magnet through the top spark plug hole and check for iron fuzz in the bottom of the cylinder.

**OIL ON SPARK PLUGS:** Worn, stuck or broken piston rings and/or worn valve guides are the usual cause. Rings can be broken and the cylinder still have good compression if the compression rings (top) are in good shape. Badly worn valve guides will sometimes allow oil to drain down into the exhaust pipe or into the carburetor duct while the engine sits idle.

**INTAKE PIPE LEAK (CARB TO CYLINDER):** This is a common problem that will lean the affected cylinder and cause hot running with excess water. Check to make sure all fittings are secure.

**EXHAUST GASKET LEAKS:** Hot exhaust gasses leaking around a cylinder head will cause excessive cylinder wear. Exhaust gasket leaks are easy to detect by visual inspection.

**FUEL INJECTORS:** Even a partially clogged injector on an injected engine will starve that cylinder and cause it to run hot resulting in excessive wear and power loss.

**MAGNETO TIMING:** Improper magneto timing to the engine can cause hot running and loss of power. Excessive or lack of mag drop is an indication of poorly timed magnetos.

**CHECKING IDLE MIXTURE:** Warm the engine to operating temperature then allow the engine to stabilize at idle RPM. Pull the mixture control to idle-cut-off and carefully observe both RPM and manifold pressure as the engine dies. RPM should hesitate (not go up more than ten RPM) before falling. Manifold pressure should go down about 1/2 inch before going up as the engine dies. Push the mixture in before engine stops and repeat the above several times. If RPM goes immediately down and manifold pressure immediately up as engine dies the idle mixture is set too LEAN. RPM up more than ten RPM and manifold pressure down more than 1/2 inch the mixture is too RICH. Idle RPM will usually require setting after idle mixture is adjusted.

**DEFINITION OF A RECIPROCATING ENGINE:** An assembly of hundreds of parts made from various metals that rotate and reciprocate several thousand times per minute at extreme temperatures and pressures constantly trying to tear itself apart.

**OIL ANALYSIS:** Routine and regular engine oil analysis can help you detect and correct small problems before they become big problems.

## 1984 EAA LYCOMING SAFETY ACHIEVEMENT AWARD

*AJAX Aircraft Training Vehicle from Richard Wright Bursett, EAA 198641, R. R. 3, Box 863, Great Bend, KS 67530*

The second place entry in the 1984 competition was a three wheeled, recumbent aircraft type control system, all-terrain vehicle. It was designed to teach the fundamentals of aircraft control within the more familiar confines of a land vehicle.

Designed on an ultralight trainer, the vehicle is described as "... more than a go-cart with rudder pedals, ... (it) recreates (a) that airplane feel."

The 1985 EAA LYCOMING SAFETY ACHIEVEMENT AWARD CONTEST has opened. Contact Ben Owen at the EAA Aviation Center for details.

# DESIGNEE VISITS

One of the important services provided by our DESIGNEEES is visiting aircraft building/restoration projects to discuss and offer suggestions about them. The DESIGNEEES in the following listing are to be commended for their efforts in helping to make sport aviation a safer activity by providing this service. Comments for publication are selected for the purpose of providing guidance or assistance to builders and the DESIGNEEES visiting them. DESIGNEEES are requested to note problems or procedures observed in their project visits in the comment's section of the Designee Visit Report.

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\*Acro Sport II

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\*Moni  
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\*Kr-1

Lee Stevens #360  
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\*Wagabond

Henry C. Burdette #488  
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\*Pletenpol

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\*Spratt Control Wing  
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\*Falcon Air

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\*Dragon Fly

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\*Glassir

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\*Glassir  
\*KR-2

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\*Aeromaster  
\*Piel Emeraude

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\*Sequoia Falco

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\*KR-2

Robert E. Burnes #1289  
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\*Q-2

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\*Corby C.J.1 Scarlet  
\*Glassir

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\*Monnett Sonoma II  
\*Rand KR-2

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\*Replica Waco 4  
\*Boomer BB-DB

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\*Vari-Eze

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\*Sidewinder

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