



# Chapter 54 News

Lake Elmo, Minnesota

February 2003

## Program

- February 10, 2003
- Social Hour at 7 p.m.
- Meeting at 7:30 p.m. Chapter House, Entrance B, Lake Elmo Airport
- Program: More than half of all registered aircraft in Minnesota are based at reliever airports, which generate an estimated \$1.4 billion annually for the Twin Cities economy. The airports are a valuable resource for the metro community, encouraging growth in commerce and jobs, providing green space and recreational opportunities, and boosting the area economy.
- Speaker: Greg Fries, Metropolitan Airport Commission Reliever Airport On-site Manager for Lake Elmo and Saint Paul Airports.

## Do your own NTSB accident report survey by John Renwick

Everybody knows the NTSB keeps its database of aviation accidents on the web for all to see, right? You can query this database in quite a number of ways - by aircraft type, date, location, severity, almost any statistic the NTSB keeps. You can find it at <http://www.nts.gov/NTSB/query.asp>

One recent evening when it was too cold and dark to fly my J3 Cub, I started to do my own analysis of accidents involving J3s, to see what I could learn. There are 473 accidents listed, going back to 1962. I looked at the 50 most recent ones, which go back a little over five years. (I'll do the rest another time!) I started a spreadsheet, listing all the different accident causes I found, counting the number of occurrences of each, how many had minor, serious or fatal injuries, what the pilot's ratings were, and so on. Even with this small sample, I found some interesting things:

- Out of 50 accidents, only seven were fatal. Many of the nonfatal ones had causes that probably would have killed the occupants of a faster aircraft.
- The five most common causes, in decreasing order, are:
  1. Loss of directional control after landing (8, 1 minor injury)
  2. Power loss after takeoff (7, 1 fatal, 2 with serious injuries)
  3. Low-level maneuvering, got too slow, stalled (5, 1 fatal, 3 serious, 1 minor)
  4. Hit a power line or pole on approach to landing (3, 1 serious, 1 minor, all by commercial or ATP-rated pilots)
  5. Continued takeoff with engine not developing full power (3, no injuries)
  6. The causes of engine failure were:
  7. Magnetos grounded by worn P-leads

8. Improper throttle cable clamp (twice)
9. Low compression in two cylinders due to leaking valves
10. Probable carburetor icing (twice)
11. Fuel valve closed
12. Exhaust valve jammed due to carbon deposits

One of the "power loss after take-off" accidents was fatal because the pilot attempted to return to the runway, stalled, and spun in.

The "Improper throttle cable clamp" accidents got my attention because the only time I ever experienced power loss, over Ripon on the way in to the Oshkosh fly-in, this clamp was the cause. It fastens the throttle cable outer jacket to the engine mount. This same part is used on many rag-wing Pipers, and it's available from Univair for about \$30. I've seen people substitute Adel clamps for it, even nylon tie-wraps in one case. If the cable comes loose at this point, you have no control over the engine. In my case the cable only slipped, so I was able to set the engine to full throttle, leave it there, and land (a 65HP J3 can fly right down to short final at full throttle, and still land at a normal speed). It seems to be a prevalent cause of engine failure.

Here are a couple of NTSB database queries you can try, to practice before surveying your own aircraft type:

1. 6/26/99, Dawson, MD. A Flight of 3 Cubs took off and climbed toward a ridge. The first one made it; the others did not. Why?

This one will make your jaw drop: Sept. 10, 1999, three Eurocopters from Juneau, Alaska.

Have fun; it's a great project for a winter evening!

John Renwick can be reached at [jkr@visi.com](mailto:jkr@visi.com)

## Ground School

by Scott Olson

Congratulations to Jeff Hove who is on the education committee. We were sitting one Saturday morning meeting on KidVenture and other education activities and Jeff comes up with this idea he coined for a Continuing Education program: "Licensed to Learn" is his new name for Ground School. Chapter 54 has never offered Ground School before. I like trying new things and I just bought a new King DVD Private Pilot course. We have a clubhouse now. Paul Anderson said he would head our Ground School up and find a couple other instructors to help teach in person. The idea probably never came up before because most of the old school (you know who you are) have licenses and have been building airplanes for years. Chapter 54 truly is evolving in to a new group of aviation pilots and enthusiasts.

We have ultralight and light plane members and the new Sport Pilot interests are bringing new members to EAA and Chapter 54 that don't have a Pilot license. We have involvement with more family activities such as Young Eagles and KidVenture and members joining EAA and Chapter 54 just for their kids to get involved in aviation and maybe someday fly in an airplane.

I thought "Licensed to Learn" (ground school) was timely, a great idea and was sure we could get ½ dozen students to sign up. Since I was signing up my high school son, who I want someday to fly, I decided to start the class early from 6:00PM - 8:00PM and offer free Pizza and Pop. Jeff, Paul, and I met and made some plans one Saturday in the 54 clubhouse a couple months ago. 48 hours before the class starts I email Paul and he taking care urgencies for the company he owns out in California. I got 25 people (the agreed maximum limit) signed up and they just keep calling. So many people are signing up I stopped keeping track and hoped some wouldn't show up. I had names on note pads, napkins, on my PDA and some at the airport.

Four hours before ground school starts Greg Sinclair calls and says he is filling in for Paul and will be teaching the first night. Greg's airplane is a 757 at NWA and Greg gave me a check ride in my Dads Bonanza. Greg is well known and respected around 21D and has probably flown in 50% of the small planes on our field. He instructs flight instructors and is more than qualified to assure the success of the class.

The first night 30 people show up for orientation. The Chapter clubhouse is packed and everybody is networking, sharing and ready to learn. Everybody is assigned a buddy. High school kids, college kids and old guys sign up for the class. I ordered Pizza and it cost over \$80. Luckily Greg's son Brian had a ½ price coupon. Pizza sucks up too much class time and too much money so everybody agreed to sign up for cookies and treats monthly and Chapter 54 provides all the free Pop.

We have 35 students signed up and just about that many come every Thursday night. Everybody is learning about aviation. Ground school is just what Chapter 54 members wanted. 10 of the students are 54 members who are in it for a refresher. The rest are going to take the FAA exam. Everybody is networking and making new friends. Let me finish with an email I received from Jeff who came up with the idea for ground school as part of Chapter 54 continuing education. Scott..... "Let me know if I'm on the right track."

## EAA Chapter 54



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Chapter member meet on the second Monday of every month at the Chapter House, Entrance B at Lake Elmo Airport (21D). The House is at the base of the airport beacon.

The newsletter is printed on the first Monday of every month. Parts of the newsletter may be reprinted with appropriate credit.

21D RCO 118.625

21D Unicom: 122.8

TPA: 1932'

**Under the Cowling****A basic primer on aircraft sheet metal**

by Jim Montague

The RV series of aircraft have brought new interest to many regarding construction of homebuilt airplanes. Suddenly, there is a lot of interest in aircraft sheet metal procedures. It might take months to learn, but the basics can be written down in just a few paragraphs.

Most of a metal aircraft structure is 2024-T3 Alclad Aluminum. The 2024 is the alloy, the T3 is the heat treatment and Alclad means it is covered with a thin coat of pure aluminum for better corrosion resistance.

Other common alloys used on aircraft are 6061 and 5052. These are weldable alloys. 6061 is used in structural applications and for welded parts such as fuel tanks.

5052 is mostly used for formed parts such as wingtips. The structure is assembled using rivets as the primary fastener. There are two basic types of rivet heads in common use today, the countersunk head (flush) rivet and the protruding head (Universal head) rivet.

The Universal head rivet is so named because it replaces the old roundhead, flathead and brazier head rivets. The old flush rivet number was AN 426 and now they are called MS20426. The old Universal head rivet is AN 470 and now they are MS20470. The most common type rivet for light plane construction is the AD rivet, which does not require heat treating. The diameter of a rivet is given in 1/32's and the length in 1/16's. A typical rivet might be an AN470-AD4-4. This is a Universal head rivet, 2117 is the alloy (AD) and is 4/32 or 1/8" diameter and 4/16 or 1/4" long. The AD rivet is marked with a dimple on the head. There are only 4 common rivet diameters. 3/16" - 5/32" 1/8" and 3/32". These require a drill with a few thousandths clearance so there are 4 basic drill sizes required. #11 - #21 - #30 and #40. The metal sheet must be held in position with a temporary fastener - called Clecoes - for Cleveland Pneumatic Company, which developed them. The Clecoes are color coded, gold for 3/16", black for 5/32", copper for 1/8" and silver for 3/32" holes.

A flush rivet can be installed in a skin which has been countersunk or dimpled. A 100 degree countersunk head is most common. Countersinking is not recommended for very light gauge aluminum and thin skins must be dimpled which does not remove any material, this takes a dimpling die, which can be used in a rivet gun or a press on a workbench.

A rivet gun is a pneumatic air hammer that has a rating of 2x, 3x and 4x etc. For the average use, a 3x gun works best. A cheap "muffler cutter" may look similar but it hits too fast and work hardens the rivet before it is completely driven.

Most light aircraft whether certified or homebuilt use metal skin, .020, .025, .032 or .040 thick. Most common is probably .025"

To fabricate a new skin for a repair to an existing airplane, obtain a sheet of aluminum identical in type to the original. If you are repairing an antique airplane, say one built before 1947, you may find markings on the back side of the sheet saying "24ST". 24ST is 2024 T3 in current language. Using a wooden bench lay the new skin upside down to avoid scratches, the lay the old skin on top of it and drill the holes using the old skin as a pattern. Drill in a diamond pattern from one corner to the



other, using Clecoes in as many holes as necessary to obtain perfect alignment. After the holes are drilled, mark around the edges and cut out as necessary.

To fabricate a skin for your homebuilt, obtain a sheet of aluminum as called out in your plans and lay it out per the dimensions given or use the full size pattern if given. There are tools available for laying out rivet spacing. Some homebuilt kits now have "matched hole spacing" for the skins and ribs or formers.

A few minutes spent reading US Tool and Supply Company's ad is very enlightening. They have a full page ad in every Trade-A-Plane. Or look at <http://www.ustool.com>

A whole book could be written about various subjects pertaining to aircraft sheet metal, and there are many books available. There are numerous textbooks and there is the FAA "Bible" - AC 43.13-1B which should be studied by anyone intending to perform aircraft metal work or any type of aircraft work. Bend radius and setback is just one subject that might take a while to master, and of course a brake press or bending brake is necessary to perform bends in metal. T3 aluminum cannot be bent with too small a radius or it will break or have little resistance to cracking.

Drilling holes sounds pretty basic and it is but it is very important. Most aircraft work is done with a

(Continued on page 4)

## EAA Chapter 54 Meeting Minutes January 13, 2003.

Meeting brought to order at 7:30PM, Treasurer's Report accepted as published in newsletter. Meeting minutes absent from newsletter.

Meeting minutes absent from newsletter.

Visitors were Jim Heiman, with daughter Kaitlin, residents of Inver Grove Heights. Daniel Billeck was our program speaker and 3M employee.

Paul Hove said all EAA 2003 Calendars have been sold.

Al Kupferschmidt, Young Eagles Coordinator, has yet to hear an official count of Young Eagles flown by the chapter during 2002. He also said 2 small groups are waiting to fly, awaiting good weather, and proper timing. Young Eagles Day 2003 is tentatively set for May 17th. In conjunction with Chapter 54's KidVenture.

Art Edlund, Flying Start Chair, was absent.

Scott Olson, Membership Director, announced 17 new members, thanks to the chapter's private pilot ground school. 29 people attended the first ground school. . Scott added there will be a Flying Start Program sometime in April. Additionally, KidVenture, in conjunction with Young Eagle's day, is May 17.

Marlon Gunderson, webmaster, encourages project pictures, pictures of members, members' planes and bios.

Paul Liedl showed off a new painting of him and his Skystar Safari.

Dale Seitzer mentioned the weekly EAA e-mail to the national membership. It included information about the Member-Land-A-Member campaign, with a grand prize of a Sonex kit. Also, the EAA has many scholarships available, including a couple catering to aspiring female pilots. Dale also mentioned that the MET council is doing a study on sport aviation in the state.

Tom Marson is looking for people with knowledge of GT Propellers. Contact him if you have any knowledge of this company.

The business meeting was adjourned, and the members welcomed Dan Billeck, from 3M. Dan demonstrated window repair using 3M's acrylic repair process.

### **Treasurer's Report** *By Paul Liedl*

Cash on hand	\$ 25.00
Checking Acct.	\$2135.65
Investments	<u>\$6000.00</u>
Total	\$8160.65

Income in October consisted of \$690 in individual dues, \$40.00 in calendar sales, and \$56.89 in "Change 54" Fund for a total of \$786.89

Expenses for the same period were \$289.83. They consisted of \$128.86 for utilities, \$91.49 for education expenses and \$69.48 for newsletter publication / dis-

### UNDER THE COWLING (Continued from page 3)

hand drill. It is important to learn how to "eyeball" a normal angle to the work, that is, a 90-degree angle. This is also important for drilling out old rivets also.

Don't think because you may be building a new airplane you will not be drilling out any rivets! If you wear bifocals or trifocals you may want to get some cheap reading glasses that focus right for the work you are doing.

Shearing metal is done with either a power shear; a foot operated metal shear, or various hand shears. Access to a power shear is great but few home workshops have such equipment. Any metal shear has limitations doing aircraft work, you are limited to straight cuts and lengths smaller than the shear itself. If you spent thousands getting a nice 8 foot power shear, at some time you might have to cut a 10 foot piece of metal, so your expensive shear would have to give way to a cheap hand shear. "Aircraft Snips" are made for right hand, left hand, or straight cuts. You will find, if you are right handed, that you will use the left cut shear most of the time. For long straight cuts a plain big "tin snips" works better than an aircraft snips.

Compound curves. We have seen in *Sport Aviation* where they take a sheet of aluminum and form it a little over a shot bag then roll it on an English Wheel and presto! They make a cowling or some exotic shaped fairing. It ain't quite that easy! Making compound curved parts is an art all by itself and requires years of practice. You get good at it the same way you get to Carnegie Hall...practice...practice...practice.

Single curved angles, using a shrinker or stretcher, however are simple to do.

Heat treating is another advanced subject. Be aware that the metal you are working with is probably heat treated and the characteristics of the metal can be altered by forming it or by heating it to any temperature above that of boiling water.

Blind rivets, often called "Cherry Rivets" for the major manufacturer, are occasionally used where there is no access to the backside of the structure. When I was in school I recall another student wondering, "why not use all Cherry Rivets"? Well, ordinary AN470-AD4-4 rivets probably cost about \$15 a pound, so for a dollar you get more than 100 rivets. A Cherry Rivet might cost from 50 cents to a dollar each! Plus the Cherry Rivets are heavier and are not as durable.

Again, read up on the subject before getting too deeply involved and get someone to guide you at first. A licensed Aircraft Mechanic spends months of classroom work and shop practice time learning the basics and then it still takes months or years of practice to get good at doing Aircraft Sheetmetal work.



## Happenings

\* EAA Ultralight Chapter 12 Minnesota Ultralight Association is inviting EAA members and guests to our next meeting for a presentation on two-stroke aviation engine maintenance and repair. Our next meeting is February 20, 2003 at 7:00 PM at the EAA Chapter 237 clubhouse on the Anoka County Airport. Dan Mattsen, a former Quicksilver dealer and longtime 2 stroke - engine - pilot and mechanic, will share his 20 years of knowledge. Anyone who has or is considering flying with a two-stroke engine should attend this free informational and practical presentation. For further information please call or email, Dale Seitzer, President, 651-329-2229, dalemseitzer@yahoo.com

## Fun with Flying

I landed near my home on Big Marine Lake in my Challenger II. It was one of the "things to do" after I completed building my Challenger II. — *Todd Balsimo*



### NAVAL AVIATION TRUISMS (Bob Waldron submitted)

#### BASIC FLYING RULES:

1. TRY TO STAY IN THE MIDDLE OF THE AIR
2. DO NOT GO NEAR THE EDGES OF IT.
3. THE EDGES OF THE AIR CAN BE RECOGNIZED BY THE APPEARANCE OF GROUND, BUILDINGS, SEA, TREES, AND INTERSTELLAR SPACE. IT IS MUCH MORE DIFFICULT TO FLY THERE.

THERE ARE MORE PLANES IN THE OCEAN THAN THERE ARE SUBMARINES IN THE SKY

NAVY CARRIER PILOTS TO AIR FORCE PILOTS: FLARING IS LIKE SQUATTING TO PEE

WHEN ONE ENGINE FAILS ON A TWIN-ENGINE AIRPLANE; NOT TO WORRY, YOU WILL ALWAYS HAVE ENOUGH POWER REMAINING TO GET YOU TO THE SCENE OF THE CRASH

NEVER TRADE LUCK FOR SKILL. THE THREE MOST COMMON EXPRESSIONS (OR FAMOUS LAST WORDS) IN AVIATION ARE:

- (1) WHY IS IT DOING THAT?
- (2) WHERE ARE WE?
- (3) OH, SHIT





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