



The ThunderWord

Thunderbird Field EAA Chapter 1217 March 2019

Scottsdale, Arizona

PRESIDENT'S CORNER

Greetings from my corner of the hangar! At the February meeting our guest speaker was Hank Rogers who told us his story of his RV-8 having an electrical fire and his forced landing in Cordes Lakes. Hank put together an amazing presentation featuring both inflight and on the ground shots mixed with pictures from the day of the event. His explanation as to what happened and what they did right and what could have been done differently was easy to understand. I hope Hank is able to share this presentation with other EAA Chapters and RV owners.

After being a tenant of the City of Scottsdale for 45 years, this month I got a hangar bill from a different company. After a few calls I was able to determine that the City Hangars and City Shades were sold to a company from New Mexico. They plan to keep the rent the same for a year then who knows...reading between the lines it was a one year eviction notice.

See you at the March meeting!

Curtis

MARCH CHAPTER MEETING

The March meeting of Thunderbird Field EAA Chapter 1217 will be held on Thursday, March 21st, beginning at 7 pm. This month's guest speaker will be legendary helicopter pilot/reporter Jerry Foster.

Guests are always welcome! .

BACKGROUND INFO ON SPEAKER

Jerry Foster came back from Vietnam with extensive experience piloting choppers. He turned that into one of the pioneering careers in aerial coverage of local news. Jerry's first

airborne news platform was a McCoulough J-2 Gyro plane. He also flew a Hughes 269, Hughes 500 and Bell Long Ranger as the need for more performance evolved.

Every day Jerry's fans would turn to Channel 12 to see what activity Jerry was reporting on, He had the ultimate job, with his helicopter parked in his front yard he was just minutes from being airborne to be first on the scene of braking news. For his dedication Jerry has received four Emmys and a Make-a-Wish Foundation trophy that he also cherishes. He was also very proud to accept the Harmon Trophy award from President Ronald Reagan in 1981. This was considered one of the most prestigious awards.

IMPORTANT – MEETING LOCATION

Until further notice all meetings will be upstairs in the Scottsdale Airport Terminal Building in the Stearman Room, 15000 North Airport Drive.

NAME TAGS ARE IN

We gave up on old vendor and had them done locally. If you don't have one come by the March meeting.

CACTUS FLY-IN

This year's Cactus Fly-In was the 61st anniversary of this event. Do to political infighting in the organization and the abrupt departure of a couple of key players this was almost the Fly-In that wasn't going to happen. Fred Borns and Michael Friedrich the two remaining officers decided to have a low key Cactus Fly-In that was by invitation only to members.

Many people expressed their opinion that this was the end of the road for the Cactus Fly-In. I personally want this event and decided to

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Guest Speaker Jerry Foster with His News Helicopter

attend on all days to show my support. When Friday morning rolled around Chapter 1217 launched Jerry Lane in his Taylorcraft with Dan Muxlow as copilot, Bill Unternaehrer in his Skybolt, Jack Pollack in his Chipmunk and me in my RV-8. As might be expected with so many different opinions the attendance was very light. It was great to see Lee Maxson's Piper J-2 with only 40 horsepower race around the pattern. There were lots of old friends and Fred Borns always had food and drinks available at his hangar. Many of the people from out of town showed up anyway as the Fly-In was part of their escape

from the cold and they wrapped it in with a couple of spring training games.

If you see the potential for this Fly-In in the future, it might be a good time to call Fred up and say you want to help next year (480) 403-1190.

WHERE THE COOL KIDS GO

The other day I was on Facebook looking at pictures of a friend of mine's Gee Bee R2 replica he is building and I came across a link from his site. It was to a Facebook member only site called NON-CONFORMANCE AIRCRAFT FAN CLUB AND BUILDER

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Planes at Cactus Fly-In

ENCLAVE. After answering a couple of questions the message was they would get back to me. Sure enough after a week I got the word I was in. After you get past the Gee Bee pictures there are literally hundreds of pages of futuristic new designs of new planes. Most of the information has a couple of pictures of what the far-fetched flying machine might look like and a couple even have pictures of the intrepid designers

working on the prototype. Usually there are some performance numbers that defy the laws of physics; but a few will grab your attention. It seems that Sport Aviation and Kit Planes magazines do a good job of covering the United States sector but are really lacking in coverage from other parts of the globe. The group has a lot of electric plane designs and is equally split between vertical takeoff planes and fast planes.



One of the Planes of the Future on Facebook site



Ted Miller's Debonair at the Cactus Fly-In

One of the speakers at the Cactus Fly-In was Ted Miller who has spent some 12,000 hours in his Debonair. Ted captivated the audience as he described his 1971 honeymoon with his bride Diane—AROUND THE WORLD IN A DEBONAIR! Ted should be on the “dinner circuit” with his absolutely hair-raising flying-adventure stories that make Indiana Jones seem like a Boy Scout. He also has a Stearman for flying in warmer times. Interesting note the Deb does not have an auto pilot!

MISSING MAN FLY-OVER

At the National Memorial Cemetery, on March 22nd, at 11:00 AM, we will all look up to see the Thunderbirds perform the Missing Man in Roger Parrish's honor. The Memorial Cemetery is located at 23029 N. Cave Creek Rd, Phoenix.

NOTES ON

WORKING WITH ACRYLIC

By Charles A. Wagner

The following discussion comes from experience working with an RV-6A sliding canopy. However, the information should be

relevant to anyone working with acrylic material.

1. CUTTING AND EDGE TREATMENT

I used a 3" abrasive cutting disc in a die grinder to cut the acrylic. To smooth the cut edges, I first used a carpenter's type belt sander (3" x 21" coarse belt) held lightly against the edge parallel to the long dimension of the acrylic. The belt smooths the edge fairly well. If it is moved back and forth along the edge, it takes out the bumps and ripples and leaves a pretty nice edge, but with some scratches. To finish, I used 60 grit sandpaper on a block to take out the big scratches, and also take the sharp edges off the corners.

2. INITIAL DRILLING AND HOLDING

I pilot drilled all holes #40, using a standard metal-cutting drill bit. Any little chips that break out on the back side are insignificant, because they will disappear when the holes are enlarged to final size. There are several advantages to pilot drilling #40. First, you can use long reach clecoes (0 to 1/2" grip) to hold

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**Chapter Member Stephanie Frazier wants to be a Professional Pilot
She joined Chapter 1217 in January and is Working on getting Her Ratings**

the acrylic to the framework as you drill. (I purchased 60 long reach clecoes, and that was just enough for my canopy job.)

Second, when you need to fit an overlying aluminum washer strip or skirt, you can enlarge every other hole to 1/8" thru the acrylic only (not thru the steel) using a drill bit ground for plastic drilling. Then tap the steel and countersink the acrylic for a #4-40 flathead screw. Although the #40 holes in the steel are a bit oversize for a 4-40 tap, you will get enough threads for the screws to hold

temporarily. This way you can get a flush surface while the acrylic stays firmly in place. The alternate holes that do not contain screws can be used to cleco the overlying part.

A third advantage to using #40 pilot holes is that blind hole-finding (described below) is more accurate than it would be for larger holes.

CAUTION ! If you anticipate significant temperature changes (more than $\pm 10^{\circ}\text{F}$) in

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Jack receiving Guidance from Supervisors Jerry and Bill

your workshop between work sessions, I suggest that you do not leave tight-fitting screws and clecoes in place. The expansion and contraction of the acrylic will generate stresses that could possibly cause cracks. You can simply remove the fasteners. Or you can drill the clecoed holes in the acrylic somewhat oversize. Oversize drilling will not help much for flat head screws, because their heads prevent the acrylic from moving freely. Either loosen or remove the screws, or replace them with clecoes.

Begin drilling the canopy by first making the 5/8" hole for the latch tube. I am very cautious about drilling acrylic, and so I did my drilling in this order:

1. Pilot drill 1/8" and enlarge to 1/4" using plastic-drilling drills.
2. Gradually enlarge the hole with a Unibit. When each step of the bit breaks out the opposite side, it is likely that the acrylic will

chip at the exit. You can avoid this problem by alternately drilling from one side and then the other. To get a 5/8" hole thru 3/16" acrylic with a Unibit, you have to drill from both sides. This is because most Unibits can only go 1/8" deep at a given diameter. (The Unibit 2 can drill almost 3/8" deep at each diameter, but it is limited to 1/16" increments and 1/2" maximum diameter. It is very useful for enlarging the screw/rivet holes.)

If you place masking tape (lightly, do not press down) over the tubular steel parts and then press the acrylic against the tape, the tape will darken at the touch line. Aim at this dark line when drilling.

Continue drilling the canopy aft along the center spine. Because these holes are hard to reach, and because you probably want them to line up in a perfectly straight line, start by pilot drilling or punching the top center washer strip on the bench, where you can get

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good accuracy. Also drill the hole for the latch tube. Place the washer strip on top of the canopy, carefully center it, and tape it down. The latch tube will center the front end, but you must manually center the aft end. Then drill thru the pilot holes, the acrylic, and into the steel tube. If you hold the drill correctly, you should get a very accurate line of holes.

CAUTION ! If you plan to insert anything between the acrylic and the underlying steel frame (such as spacers, rivet nut heads, large washers, washer strips, etc.), insert temporary shims of the same thickness as the final assembly as you drill and cleco. It is not necessary to insert these shims along the center spine as you first drill it. But after it has been drilled, insert the shims before you drill anything else. Continue to insert appropriate shims hole by hole as you go down the sides of the canopy and the windscreen. Because the canopy and windscreen may both need shimming where they butt together, drill one hole thru the canopy and one just opposite thru the windscreen at the same time. Shim both as needed, then continue to the next hole. If you do not install shims as you go, the holes thru the acrylic will misalign with the holes in the steel when the shims are installed at a later time.

Two suggestions: First, use vinyl shields over the ends of your long reach clecoes to prevent scratching the acrylic. I made my own shields from standard protective vinyl caps (3/8" diameter by 1/2" long) by punching a hole in the end with a leather punch.

Second, you will need to do a lot of blind hole-finding to locate holes in the overlying aluminum parts after the acrylic and underlying steel have been pilot drilled. I used many strips of drafting vellum about 1 1/2" wide by 4" or 5" long, taped to the acrylic and overlapping each pilot hole. By lightly rubbing a pencil over the hole, the hole outline shows up clearly on the vellum. Where #4-40 screws are holding the acrylic, the outline of the Phillips screw slot marks the

hole. The aluminum is slipped under the vellum strips. When the aluminum is correctly positioned, a sharp prick punch can be used to make a small nick in the aluminum by pressing the point thru the vellum in the center of the hole. When the aluminum is removed, the nicks can be enlarged with a regular center punch and then pilot holes can be punched. I like to use a Roper Whitney hand held metal punch to make these holes, because the punch has a centering point that fits into the center punch mark and keeps the hole exactly in position. It does not walk like a drill bit. If the holes are punched 1/8", they can be easily reamed out for pop rivets or screws, depending on what you plan to use.

3. ENLARGING HOLES AND COUNTERSINKING IN ACRYLIC

After all of the holes are pilot drilled in the acrylic, and presumably all of the aluminum parts (skirts, washer strips, etc.) are basically complete, it is time to disassemble everything for final hole preparation. There is nothing special about preparing the holes in the aluminum. However, the acrylic requires special attention.

My experience has been that plastic-drilling drills up thru 1/4" seem to drill thru the acrylic fairly safely, creating very little or no chipping where the drill exits (as long as you don't press too hard). However, the expansion and contraction characteristics of acrylic demand that most holes be larger than 1/4". Larger plastic-drilling drills can be used by drilling first from one side part way thru, and then back thru from the other side. A Unibit can also be used the same way. The Unibit 2 can reach all the way thru the acrylic from one side, but it scares me when it breaks out the other side. So I always drill from both sides when going over 1/4".

You may plan to control the position of the acrylic during expansion and contraction. For example, you may want the butt joint between the canopy and windscreen to maintain a fairly constant gap over temperature to get a good weatherseal. In this case you may wish

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to elongate certain small holes rather than make them large and round. If you are using #6 screws, start with 5/32" round holes in the acrylic. Countersink them slightly to mark the center. Elongate the holes both ways the required amount with a 5/32" chain saw file. These files really work well, and it does not take long to elongate a row of holes.

After all holes are either drilled to size or elongated, deburr the insides and countersink the outsides to provide space for the dimples in the overlying aluminum. Countersinking the acrylic was the most demanding part of the job for me. Oddly enough, countersinking the elongated holes was easier than countersinking the large round holes.

First, the elongated holes. I used a multi-flute carbide countersink, 100° by 3/8", in a die grinder. I found that it must never touch both sides of the hole at the same time. If it does, the countersink will start to jump around and chew up the acrylic. It can ruin your whole day. Just lightly move the countersink around the periphery of the hole, touching only one edge at a time. You can determine how much cutting to do by using a scrap of aluminum with an appropriate dimple as a gauge. Precision is not required. You are simply trying to remove enough material so the dimple will slide up and down the full length of the hole while the flat part of the aluminum stays against the acrylic. Do not remove too much material. You really want the dimple, not the screw shank, to constrain the movement of the acrylic in the sideways direction.

Now, the round holes. I used a multi-flute carbide countersink, 100° by 5/8", in a slow-turning (400 rpm) drill. It is necessary to stop frequently and clear the chips out of the countersink. When you are about deep enough, clean the countersink thoroughly and take one final, very light cut. This step cleans

up any gummy residue in the hole caused by chip overload. The process was painfully slow. (Well, it took over an hour to do the canopy.) However, before you jump ahead and try something faster, consider how much time (and money) you would lose if you ruin your canopy or windscreen. Here are some of the things I tried (mostly in scrap acrylic) and the results:

1. I tried using a conventional 4-flute metal-cutting piloted countersink in a drill. Every so often, it would hog in and chip out a gaping crater.
2. I tried using a non-piloted single-flute metal-cutting countersink in a drill. At first, it seemed to work well. Then it tried to walk off-center. Besides making a lopsided countersink, as the hole got bigger it began to impact on one side, once per revolution, threatening to break the acrylic.
3. I tried using both a non-piloted 6-flute "chatterless" countersink and my recommended multi-flute countersink in both a high speed (2000 rpm) drill and a die grinder. The chatter was horrendous.

4. RECOMMENDED TOOLS (not available from Avery)

MSC, various locations in the East, (800) 645-7270

- Carbide Multi-flute Countersink, 100° by 3/8", P/N 02077246, \$13.19
- Carbide Multi-flute Countersink, 100° by 5/8", P/N 02077402, \$20.85

McMaster-Carr Supply Co. Various locations. Los Angeles phone (562) 692-5911.

- Vinyl Caps, 3/8" dia by 1/2" long, P/N 9753K39, \$2.65 for 100

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