



Wooden Aircraft – Perfect cuts every time

*Winnipeg Area Chapter of RAA Canada*

*January 2009*

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***CALENDAR OF EVENTS***

- January 29** RAA - CASARA – COPA - **Rust Remover Recurrency Workshop**  
**Note:** This is 2 weeks later than our regular meeting.
- February 19** Tour of ACC (location details to follow)
- March 19** Still up in the air
- April 16** Still up in the air
- May 15** Tire Kick – Lyncrest Airport

**RAA/CASARA/COPA Rust Remover Recurrency Workshop.** Rust Remover 2009 will be held at **7pm** at the ANAF Veterans Hall 3584 Portage Avenue. Presenters will be Peter Hildebrand from the Transportation Safety Board and Jerry Roehr our new COPA director. The topics at these Rust Removers are always interesting and informative. Admission is free and Coffee and donuts will be served. COPA Flight 35 will hold a small raffle for a \$10 donation to the local flight.

## **2009 Memberships are now due.**

Our Chapter is a member of the National RAAC and \$15.00 of each membership goes to the National RAAC, which provides liability protection for the various activities supported by our Chapter and the executive. The RAAC is the aviation body that best supports the recreational aircraft enthusiasts. Membership in the RAA makes it possible for the RAAC to do much more for us. Our chapter's Executive and Directors believe in the RAAC and strongly encourage our members to support it. The RAAC is the recreational aircraft enthusiast's voice with TC, promoting our kind of aviation. Should you ever be stranded away from home, the RAAC provides a means of finding assistance for you when you need it. The RAAC was instrumental in getting what is now the MD-RA inspection program, set up and working. The RAAC deserves our support, particularly from amateur-builders and those with aircraft in the owner-maintenance category. We encourage you to please consider taking out or renewing your membership in our Chapter. There is a renewal form at the end of this newsletter.



## **Christmas Pot Luck Dinner**

It was another great potluck dinner on Saturday December 5, 2008. Approximately 30 aviation enthusiasts and their spouses/friends attended and the varied selection of food provided lots of choices for everyone. Nobody went away hungry and the evening was filled with lots of laughing and friendship. Thanks to everyone who helped set-up and clean-up after.

## **Coming Events**

Bingo helpers needed for Lyncrest Flight Centre fund raising initiative - Wed Jan 14th and Sat Feb 21st from 4:30 - 6:45 at 484 Mc Phillips Street Station Casino, contact Jill Oakes if you are able to volunteer.

Jan 31st - Igloo Building, winter survival and search and Rescue, with Lyncrest, U of M and CASARA - hot chocolate and lunch. Everyone welcome. Bring your kids and enjoy a winter day. Free overnight accommodation to those interested in spending the night under the winter skies. Lyncrest Airport from 9:30 until noon.

ACC Tour - The YWG ACC tour is all set for Thursday Feb 19/09 from 1900 to 2100. For security, we need to know whose coming, how many vehicles and the names of the drivers. Please advise Paul Dyck at 668-2834 or email Paul at cgrip@mts.net to register for this free tour and he will coordinate with ACC.

## Accurate Wood Cutting For Aircraft Construction

### Steven Sadler

One thing you quickly find when building a wooden airplane is that there are few square corners. And, while "close enough" may be OK for building a doghouse, you want something better in your airplane. Here are a few tips to get accurate joints first time and (almost) every time.

### The Tools

You will want a cut-off saw which can swivel left and right and pivot up to 45 degrees from vertical. The saw doesn't need to be expensive but it does need to be accurate. Check it with a combination square for 90 and 45 degrees. The second and most important feature is that the saw has good bearings. Grab the saw blade and wiggle it back and forth. If the saw spindle moves back and forth when you wiggle, good cuts are impossible.

Fortunately most saws these days have reasonably good bearings. With very little force you can bend the saw blade slightly and that's OK but the spindle at the centre of the blade should not slide back and forth.

Since you will be making cuts at many angles, check that you can set and lock the crosscut angle wherever you want rigidly. Most saws have detent settings at 90 (shown as 0 on the scale), 45 degrees and possibly some others such as 22.5 degrees and 60 degrees. The trick is setting the angle at something close to a detent setting. On some saws you cannot set a 43 degree angle for example. The saw will jump into the 45 degree detent setting and there's nothing you can do about it. If you are buying a saw check it out before you buy. Set the angle to 43 degrees and clamp the setting, then grab the handle and wiggle back and forth. See if the setting on the scale is at 43 degrees, or has it slipped into the detent setting at 45 degrees?



You will need a crosscut saw blade which will make a smooth cut – I use a 60 tooth fine crosscutting blade but others will do a good job. Sharpness matters.

For measuring and transferring angles there is no substitute for a T-bevel sliding square. (See the photograph below). This can transfer any angle from paper to wood or from wood to your saw. Only costs about \$30.

Additionally you will need a combination square, a roller support to hold the ends of long pieces, sharp pencils, good lighting, and a good tape measure.

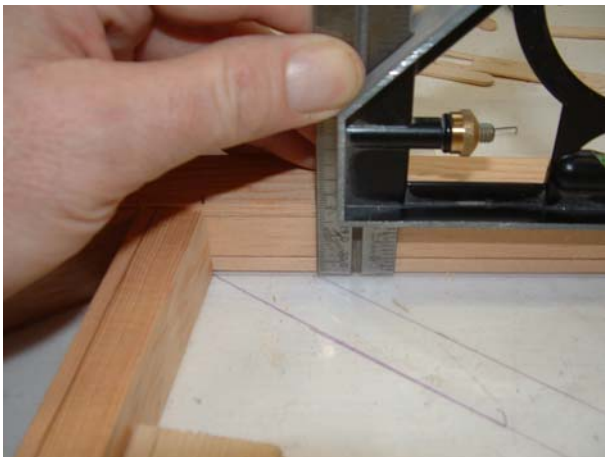
I have found a wall mounted pencil sharpener well worth the small cost. Keep a box of sharp pencils handy. When one gets dull, get a new one, then at the end of the day, sharpen them all and put away for the next day.

You can't make accurate cuts if you can't see. If the light in your work area isn't ideal (and whose is?) get a couple of student desk lamps with the long pivot arms. Mount one at your saw and one where you are measuring your project. They can clamp on to most surfaces, so you can move them where you need.

Finally, where precision is required, I like to start a project with a new tape measure. Tape measures do get inaccurate with age, mainly at the measuring hook. The hooks start out square, but the first time you drop the tape on the floor, it probably won't be square anymore. This means a slightly different measurement depending on the thickness of the workpiece and whether you are measuring to an inside or outside location. Also, the sliding slot on the hook wears slightly over time so you will get inaccurate measurements as the tape measure ages.

## Measuring and Setup

Once the layout is drawn out on the work surface, transfer the measurements to the top of the work piece, in this case a longeron, with a sharp pencil and a combination square as shown in Figure 2.



*Figure 2: Transferring Layout From Surface to Top of Longeron*



*Figure 3: Transferring Angle to the Saw*

Use the sliding bevel to measure the angle of the line laid out on the work surface. Once set you need to make sure you don't hit the square on anything. If it moves you won't be cutting the right angle. Take the sliding bevel over to your saw and set the angle as shown in Figure 3. Really astute readers will notice something is wrong here. I have an angle smaller than 45 degrees to cut but my saw only goes over to 45 degrees! What now?

The solution is relatively simple. Add 90 degrees to the cut angle. You do this by taking a piece of wood, a 2 x 6 works well for this, and use it for an additional fence. You then put your bevel angle into a range the saw can handle.



Figure 4: Transfer Bevel Angle to Saw

To make an accurate angle setting, look for a thin sliver of saw base to show at the edge of the bevel blade. Move your head back and forth as you look at the edge of the blade. If the angle is just right the sliver of base will appear equally at the front and back. If you see a triangular sliver of base appear at the back (or front), then the angle isn't set quite right. Figure 4 shows a setup with the saw bevel angle exactly matching the sliding bevel. (Note the thin sliver of saw base casting appearing to the right of the bevel blade)

When doing cuts with a 2 x 6 you need three hands. Awkward work with tools that can easily remove parts of your body is usually a bad idea, so clamp the work.

Figure 5 shows how. Make sure the saw blade won't hit the clamp.

For the second cut both the angle and length are important. Setting the angle is the same as for the first cut. When doing cuts with a 2 x 6 you need three hands. Awkward work with tools that can easily remove parts of your body is usually a bad idea, so clamp the work. Figure 5 shows how. Make sure the saw blade won't hit the clamp.



Figure 5: Clamping the Work

For the second cut both the angle and length are important. Setting the angle is the same as for the first cut.

Figure 6 shows the technique for measuring length. You can't accurately use the hook at the end of the tape measure for this. I like to use the 10 inch mark on the tape as shown (Just make sure that you subtract 10 inches from the total length when you cut!). When measuring for length it is a lot easier if you measure to the pointy end of the first angle cut. This will allow you to hook the end of the tape measure over the first bevel when measuring length.



Figure 6: Measuring for Second Cut.

Note 10" mark aligned with pencil line.



To get accurate length cuts marking technique is important. As mentioned earlier, a sharp pencil is important. Use the T-Bevel to layout the line on the wood and put a small "x" on the cut side. It is disappointing to cut on the wrong side of the line and find that your piece of wood is one saw width too short. Figure 7 shows an example of a good cut line.

**Cutting:** Lower the saw blade to the cut line and check for accurate placement. Move the wood back and forth until you get a perfect alignment with the edge of the blade. When everything looks good, lift the saw blade a bit and start the motor.

Figure 7: Cut Line Technique

Wait a second for the saw to get up to speed then slowly lower the blade through the wood. If you rush any of this, the saw will tear the wood rather than making a clean cut.

That's it. Repeat as necessary. With some care, every joint will come out like the ones in figure 8.



Figure 8: Perfect Cuts every time

**Steven**

**2009 Membership Form**

**Winnipeg Area Chapter RAA**

Trial (\$25)

Student(\$25)

Full (\$50)

**Required Information**

Name		<b>OFFICE USE ONLY</b>	
Mailing Address		Renewal Date	
Phone(s)		Chq. Other	Cash
E-mail		Initials	
Are you an RAA national member? <sup>(1)</sup>		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Do you give permission for your information to be made available to other Winnipeg RAA members?		<input type="checkbox"/> Yes	<input type="checkbox"/> No

**Optional Information**

Do you own an aircraft?	<input type="checkbox"/> Yes <input type="checkbox"/> No Make/model: Registration:	Are you a member of other aviation groups?	EAA: <input type="checkbox"/> COPA: <input type="checkbox"/> Others:
Are you building or restoring an aircraft?	<input type="checkbox"/> Yes <input type="checkbox"/> No Make and model of project(s):	What Pilots licences and ratings do you hold?	

Please make cheques payable to: RAA - Winnipeg Chapter  
Mailing Address: RAA c/o Steven Smart, 27 McCreedy Road, Winnipeg, MB, R2K 3W8

**Notes:**

- 1) RAA Winnipeg contributes \$15 per member towards the insurance program maintained by RAA national. This program provides liability insurance to cover local chapter events. The \$15 does not provide membership in RAAC.