

EAA'S HOMEBUILT AIRCRAFT COUNCIL REPORT, May, 2006

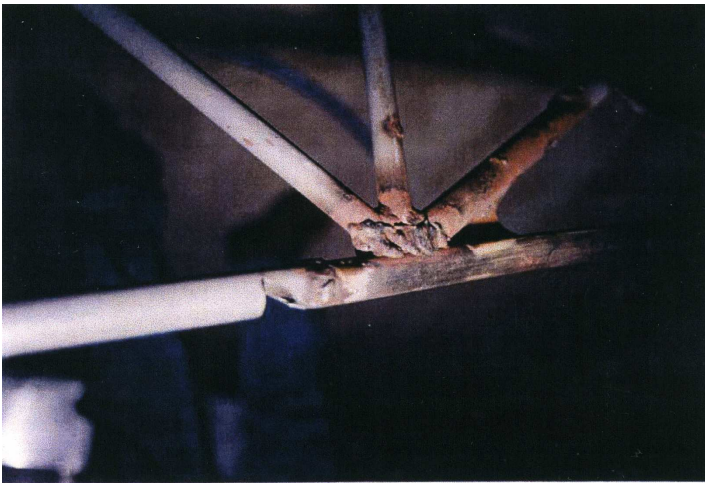
**'I WANT TO BUILD MY OWN AIRCRAFT'
PART 5: QUALITY CONTROL**

"I'm reading drawings and instructions! I'm laying out patterns! I'm cutting out pieces of materials I've never used before; aluminum, fiberglass, wood! I'm fitting and fixing things together! How good is 'good'? How good is 'good enough'?"

AIRCRAFT CONSTRUCTION STANDARDS:

When I started building my RV-4 tail kit, I asked a friend to evaluate my workmanship. Let's call him 'Dave'. Dave was also an airworthiness inspector for Transport Canada, and consequently was concerned about what role he should play in our friendship. And so he asked me, "Jack, what do you want of me?" In order to relieve his professional concern, I asked him to circle every rivet that would not pass his own quality control test, had he driven the rivet himself. He said, "Really?" I said, "Yes." Upon which he began to circle every rivet.

This story is true. (Well not every rivet!) But early on, we want to know if our workmanship meets a standard level of 'good' or even 'good enough'. As we progress, we will establish our own standard of excellence or bar. And as we see good work of other builders, we will unconsciously raise our own standard or bar. But initially, we're flying blind, and how good is good enough?

**UNACCEPTABLE WELD**

This issue should be of primary concern early in our building career. In our EAA SportAir Workshops, many builders come with a kit purchased but with a hesitancy to begin work, simply because of an understandable personal lack of confidence. Building an aircraft is not difficult. It does require patience, learning, and acceptance,

both of failure in some instances, and of pride when we're successful. Most important is that every component should meet a level of quality that will ensure safe flight.

PERSONAL PREPARATION AND SKILL DEVELOPMENT:

You wouldn't try to fly an aircraft without some preparation in learning to fly! Why would you hurry into building an aircraft without testing your building skills and abilities on samples? Even after you are well advanced in building skills, you will still want to practice procedures and processes before each new application. We all get rusty whenever we leave a process for a time period and when we come back to a similar process, we first need to get back-to-speed by practicing on a sample. This applies to flying an aircraft, playing a musical instrument, honing up for an examination, or building an aircraft component.

For example: Driving solid rivets with a rivet gun and bucking bar, allows a great opportunity to mess up. My advice to students learning this skill is to drive 20 solid rivets in a scrap piece of aluminum each day for 10 days. Don't drive the 200 rivets in the same day, but allow yourself time between each session. You will be surprised at how your riveting skill will develop over this time period, and I guarantee that after this ten day exercise you will feel confident and sure of your rivet-driving ability. Driving a rivet properly requires experience involving: hand-eye coordination, the sounds created, the way the rivet gun is set for air pressure, the teasing or triggering of the gun, the mass or position of the bucking bar, the comfort of your body stance, the rigidity of the work-piece, and the list goes on and on. All aspects play into the computer called your brain and all of this is developed over time and through practice.

The same thing applies to all mediums that you will work with in building your aircraft; sheet metal, wood, fiberglass, fabric, welding, avionics, whatever. Practice and develop your abilities on trial pieces, then go do the real thing!

Seek opportunities to learn new skills from work seminars. I have experience in welded tube-and-fabric, wood, and sheet metal aircraft construction. My knowledge in composite construction is at best limited. I'm of the firm belief that fiberglass and its family of discontents, are products from ... well you fill in the blank. And

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then, when I look at the incredibly beautiful aircraft made from these products, I just know that I need to investigate this process further, and I have now enrolled in an EAA SportAir Fiberglass workshop. Will I be building a composite aircraft? Probably not! But will I learn a whole bunch, and will I enjoy the workshop? Very much!

MENTOR:

Establish a relationship with an experienced mentor. Do this early into your building project. Mentors are available by the hundreds. But pick one in whom you have trust and confidence. EAA has a program called 'Technical Counselors'. To be registered as a Tech Counselor with EAA, you need to have built an aircraft, (or have equivalent education and experience). These guys and gals offer their services as mentors to builders. They will not do the work for you, but will help you evaluate your own work and develop your own bar of excellence. Their services are free of charge; you may want to buy them a coffee, or help them with travel costs, but the value they can give to your building project will be priceless.

AIRSHOWS AND CONVENTIONS:

You will see builders examining amateur-built aircraft at airshows and convention sites. And you will see them look at details that often cause problems. Do this yourself. Do not underestimate the benefit you can receive from looking at the products and workmanship of others. You will see workmanship that will encourage you and help you establish excellence in your own work. You will also see workmanship that will jar you out of complacency with a determination to do better.

On our RV-9A, we elected to do our own panel. With a number of instruments and a number of wires to run, and thinking the shortest path between two points is a straight line, right?, our panel quickly began to look like an overgrown bird's nest. Tracing wires became a serious nightmare. Then at a visit to an avionics booth at Sun-n- Fun, I saw a beautiful panel; wires run in tight straight-line bundles, everything accessible and trace-

able. On returning home, we tore out the bird's nest and began a complete new wiring plan. We still wouldn't profess to be avionics pros, but we are happy with the results.

YOUR PERSONAL QUALITY CONTROL BAR:

Let me conclude this column with this thought. Quality control in the building of your own aircraft is a personal

thing. You share it with no-one. But you do address it in your every detail and work effort. As you progress, your quality bar will be raised by your own expectations. Your own assessment of your aircraft's quality is primarily subjective, but I believe we all can agree that a base-line of quality and structural integrity are an absolute requirement. How far you go beyond that is up you.

Quality will depend on your attitude, experience, knowledge of processes and procedures, skill level, determination, and willingness to repeat and rebuild as necessary, to meet your expectations. All of these factors can be addressed and worked on. Quality is a moving target that will shift as you proceed, always, hopefully in only one direction; upward. If, at any time you notice that it is proceeding in a negative direction, it's time to regroup, rethink, re-establish, re-learn, and rebuild.

Jack Dueck, EAAHAC



COREY BERG'S BEAUTIFULLY CRAFTED 'SYMMETRY'