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# Repairman Inspection Course Review



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by Carol Carpenter

I field phone calls daily from individuals thinking about taking the two-day repairman inspection course, or even the 3 week LSA maintenance course that Brian, my husband and I team teach. I usually explain that the course is full of important information and often the response is something like "I've got A&P mechanics on the field and I've been flying ultralights for years—I don't need this course." So who better to tell you about the course than the man who made a very similar comment? Jim Hansen is the FBO operator at Albert Lea and has experience in a wide range of aircraft—from LSA's to jets. Read on...

### **Light Sport Repairman Inspection Training** A review: By Jim Hansen

I recently hosted a Light Sport Repairman Inspection course in Albert Lea. The FAA accepted course was presented by Rainbow Aviation – Carol and Brian Carpenter – of Corning, California.

I was merely hosting the course, not taking it. I figured "I've got A&P mechanics on staff and I have a lot of time in little airplanes—I don't need this course." I was wrong—in fact, I was SO WRONG that I felt the need to tell anybody that flies light sport airplanes about the Carpenter's class. (weather you fly A E-LSA or Amateur built- it's a must)

I own two light sport airplanes—a Kitfox certified in the Experimental Am-

ateur Category and a Kolb Firestar, certified as Experimental Light Sport Aircraft (E-LSA). Both are powered by 2-cycle Rotax engines.

Brian and Carol came to Albert Lea and set up a Powerpoint presentation for the 16 attendees in one hangar and a separate classroom in another hangar. Their 16-hour LSA Repairman Inspection Course is limited to 16 members at a time by the FAA. Completion of the course allows an aircraft owner to do their own annual condition inspection on their own E-LSA aircraft. Because it is an FAA Accepted Certification Course, it is conducted under the auspices of the FAA. Brian and Carol laid out the ground rules for the attendees—no cell phones, no excused absences and 50-minute sessions with a 10-minute break every hour. The instructors would be available to answer specific (as compared to generic) questions during breaks or after hours in order to keep the presentation on schedule.

That's not to say that the class was without humor. During all breaks, the Powerpoint projector screened humorous Light Sport aircraft accidents and incidents.

The Carpenter's are well-suited to putting on this kind of presentation. Brian is a Sport Pilot Examiner, a Designated Airworthiness Representative, an A&P, IA, Certified Flight Instructor, EAA Technical Counselor, EAA Flight Advisor, and an Ultralight Instructor and Examiner. He has been flying ul-

tralights since they have been around and also “wrenched” on large transport piston-engine fire fighting and transport planes. You may have seen him in a series of LSA videos released by EAA (more are in the works.) Carol is a Sport Pilot instructor, a certified teacher, a Private Pilot, an FAA Ground Instructor, an Ultralight Instructor, a repairman with a maintenance rating, a FAAST Team Representative, and a member of ASTM. She is a FAA Safety event presenter and an aviation magazine columnist. The Carpenters have several FAA-approved courses including the 3 week maintenance course.

Though there are Repairman Inspection courses for each LSA aircraft class: (gliders, gyrocopters, trikes, powered parachutes and fixed-wing aircraft) our class was specifically for fixed-wing E-LSA aircraft.

Like all FAA-approved courses, the program starts out with general Federal Aviation Regulations. You have to know what the legalities are before applying maintenance techniques. The Carpenters didn't let the presentation get long and boring though. They quickly moved on to airframes and engines—how they operate and how they are supposed to work. After presenting the Powerpoint slides, Brian or Carol would dive into their bag of mechanical props to produce an actual example of a piston, bolt or other piece of equipment and what it was supposed to look like—and as often as not, an example of an abused piece

of aeronautical machinery. They had MY attention!

The group was eventually split up—8 people to view Carol's presentation of FARs, ASTM Standards and theory, and 8 to receive “hands on” training from Brian—and “hands on” it WAS! Brian explained how equipment was SUPPOSED to work, common mistakes that owners or repairmen make and examples of the consequences of those mistakes. Both good and damaged bolts, hardware, engine parts, fuel system parts and brake parts came out of his bag of tricks and students had the opportunity to experience handling the hardware and viewing the consequences of bad operation. Both 2-cycle and 4-cycle engines were discussed. Brian held everyone's attention with “Has this ever happened to you?” stories—and invariably, someone in the group would 'fess up to having done something similar. Carol did the less exciting but obligatory lecture on required signoffs and documentation—as well as ELT inspections, procedures, resources and service bulletin & manual procurement.

A LOT of information was imparted in only 16 hours—and there was a written and practical test at the end. I wouldn't have believed that most people could pass that test in only 16 hours, but all participants past with scores of 90% or above. There was probably just as much information presented during non-class hours.

## Why I'm Concerned

After thinking about the information presented, I began to realize how much we as pilots and mechanics of "regular" airplanes don't know. And we don't know that we don't know it. Though this was presented as an inspection course, plenty of operational tips were presented as well. The term inspection is important since the LSA Repairman maintenance training is the 3 week course for the "sport mechanic" - this class allows the participant to charge for his services. The repairman may maintain, repair, service and inspect all factory build S-LSA and E-LSA aircraft and charge for his services. We take for granted that since we can fly larger airplanes, that these smaller airplanes will fly like and be maintained like those airplanes. This is not the case. Without divulging Rainbow Aviation's entire course content, let me give you a few examples"

- "How many of you have had an engine failure on your LSA? I've had 16 of them—mostly during the first years of ultralights. Let me tell you this—I've torn down or been involved in the tear down of over 1000 Rotax engines—some after failure, most for normal maintenance--and I've NEVER seen a failure as a result of a manufacturers defect. Nearly all LSA engine failures are caused by operator or maintenance errors."
- "How many of you use mixed fuel? The specification is 50:1 gas/oil mixture. Do you ever mix a little more

oil thinking you are running "richer" with oil to be kind to your engine? DON'T DO IT! #1: You lower the octane of the fuel, #2 you lean out the mixture adding more oil which makes the percentage of fuel to air go down as it is displaced by oil. #3 You risk a fouled spark plug. Rotax specified that mixture for a REASON—follow it!"

- Holding out a handful of hardware, Brian asks the students to pick out the aircraft-quality bolts and the non-aircraft hardware. "You see these bolts? We call them 'butter bolts' because they are so soft."
- "People ask me to look at their engines because they can't get it adjusted properly. The first thing I ask them is 'What have you done to it?' I tell them to take it back to factory specs and invariably, the engine runs just fine. Most problems come from some well-meaning, but misinformed person 'tweaking' the engine. All you are doing is treating the symptoms, not the problem. This is a precision piece of machinery, manufactured in a facility that could double as a medical facility, staffed by people carrying clipboards and wearing white coats with the name 'Doctor' on them. Do you think you know more about this engine than the manufacturer?"
- Brian asks "What static RPM does your 2-cycle turn. Only 5800? Have you had your engine failure yet?" This launches a discussion on proper prop selection and pitch.
- Both Brian and Carol discuss the differences in flying "regular" air-

planes and LSA's in their books—Sport Pilot—Airplane and A Professional Approach to Ultralights Micro-meteorology, Aerodynamics (and Dynamics), flight planning, operating tips, things to watch out for—all of the differences (and there are many) between “regular” airplanes and light sport airplanes are covered. Example: LSA's, by definition, are, well—LIGHT. They lack weight—mass—inertia. They glide slowly, but they don't glide far. Put a golf ball and a ping-pong ball in one hand, and give them a throw. The heavier ball flies much farther. Same thing for a very light airplane—pull the power, and it doesn't glide far. Glider pilots recognize this and adjust by speeding up into a headwind—or even carrying water ballast.

After auditing the course, I went over to my own LSA aircraft and looked at some of the items that had been covered in the class—and there were several. Mechanics trained on Lycomings, Continentals, and certified aircraft just aren't “spring-loaded” to look for problems that may be unique to LSA aircraft. Pilots not used to the different flight characteristics and the high power-to-weight ratio of many LSA's may find themselves in a situation they are unprepared for, but could have avoided. This course contained critical information on today's aircraft and engines and many common mistakes that owners make that can cause engine failures.

Are LSA's SAFE? Absolutely. These are not “toy” airplanes—they are good and useful flying machines and a blast to fly—but like the “black humor” about the J-3 Cub—“It goes just fast enough to kill you!” That's true of ANY piece of machinery. It's incumbent upon all of us to learn about the machinery we intend to operate. After taking the course, I feel more secure than before in the maintenance and operation of my LSA aircraft.

Give LSA's a try—they are a lot of fun—but like any airplane, LEARN about the craft you are about to command. Rainbow Aviation offers the Repairman Inspection courses throughout the United States. It is easy to host one in your area. For more information visit [www.rainbowaviation.com](http://www.rainbowaviation.com) or call 530-824-0644.



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