



Experimental Aircraft Association Chapter 166

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President's Message *by Ken Benson*

Hi Folks...it's been a long hot summer...sure has gone fast, though. We started with Sun 'n Fun in April, followed by AirVenture 2007 in July. Now we have the AOPA Convention coming to Hartford the beginning of October. A busy, busy year!!!...

I'd like to get caught up on a few things. First congratulations to our Joe Gauthier for receiving the 'Spirit of Flight' honor at the Homebuilders Dinner at Oshkosh this year. The award is sponsored by the Society of Experimental Test Pilots and is presented to the EAA member who best exemplifies the spirit of research, development and flight-testing. That's our JOE!!!!...

The Chapter received thank-you notes for the donation we made in memory of Walt Johnson from the Middlesex Hospital and Walt's family. Walt will be missed by all of us...

I got a letter from Headquarters that our Newsletter Editor was not selected to receive the Newsletter Editor of the Year Award. I submit the recommendation for the Award this spring. I'm sure you will agree with me that Al Cross is well deserving of the award. But unfortunately the evaluators did not agree with us. Al, you are still the best in our eyes and we appreciate your efforts.

We are changing the location and day of the week for the Annual Meeting this year. It will be held Friday, November 9th at the State Armory Officers Club. I have attended many events at the Officers Club. I believe you will find the atmosphere and food to you liking. More on the program in later newsletters.

We have a fly-in planned for September 15th at Brainard Field. The plan is to have a cook out, sharing our flying stories and displaying our aircraft...

Messages from Headquarters indicate the airlines are mounting an intensive PR campaign for increased user fees for general aviation. Headquarters offers sample letters you can us to contact your federal representatives.... Go to the EAA website to get the information.... We have to act now or we could be hit with a whole new bureaucracy that will make flying much more expensive and add nothing to safety or convenience...

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Next Meeting

August 24, 2007, 7:30 PM PWA TRAINING CUSTOMER CENTER

Program: The EAA Hartford Chapter 166 is proud to have as a speaker Tuskegee Airman Flight Officer **Connie Nappier, Jr.** Flight Officer Nappier will share with us his experience as a pilot with the 332nd Fighter Group in the European Theater

Directions: Enter PWA at the Silver Lane entrance, Exit 58, off of I-84. Take next left after UTC Research Center to Customer Training Center.

TOOL FORM**EAA CHAPTER 166**

EAA Chapter 166 Members. This form is intended to compile a list of tools that chapter members would be willing to loan other members of Chapter 166. The logistics of all loans would be the responsibility of Chapter members. Please provide completed forms to Aaron Gleixner (aarongleixner7@sbcglobal.net) or at any meeting for compilation and distribution to Chapter members.

Name: _____ Phone #: _____

Street Address and City: _____

List of Tools and Brief Description Available for Loan:

- 1) Example – HobbyAir Positive Flow Respirator System for Painting
- 2) Example – Engine Hoist for Mounting of Engine
- 3) Example – Compression Tester for Lycoming Engines
- 4) Etc

CLASSIFIED

FLIGHT INSTRUCTION: All types of general flight training and check rides by a CFII. Flexible arrangements. Joe Gauthier (860) 635-4058.

WANTED: Seasoned Aviators - Do you remember that special adult that fostered your interest when you were young? We have a thriving Civil Air Patrol squadron that meets on Friday nights at Brainard. If you want to volunteer your time just once, or on a recurring basis, please contact Jeff Dill at 860-295-8372 (home), (860) 985-4315 (cell), or 1dillfamily@sbcglobal.net.

RV6 PROJECT: Needs Completion—Empennage & Wings built from Van's standard kit on Phlogiston spar with gold anodized ribs and skins primed inside and out. Quick-build Fuselage with top skins and interior components completed. Sliding Canopy cut and fit including Carbon fiber/Kevlar skirt. Factory new Mattatuck XP360 with electronic ignition and fuel injection. Project needs the engine hung, wiring, plumbing, fiberglass finishing work, paint and interior. Looking for an experienced builder or A&P to complete this project in my shop or yours. I will consider any reasonable arrangement including barter, a partnership or an outright sale of the whole project. I have well over \$50,000 and many, many hours invested in this project and really want to see it completed and flying. Contact Alan Ortner at 860-345-7795 or aeortner@comcast.net to discuss and make arrangements to see the project which is currently located in my shop in Haddam, CT.

PRESIDENT

Finally be sure to attend the meeting on August 26th. Our speaker is Connie Nappier, a Tuskegee Airman. Connie will share with us his experiences in those heady days of World War II and the introduction of the African American into the military flying game...

Remember, any tool, when dropped, will land on its sharp edge or roll to the least accessible corner...

Clear skies and calm winds...

Ken Benson, President

Treasurer's Report August 2007

Checking Account:		\$ 4,224.45
Deposits:	Dues	\$ 16.00
Total Deposits:		\$ 16.00
Total bills:	Internet fee	\$ 29.94
Balance in Checking		\$ 4,210.51
Petty Cash:		\$ 00.00
Plus decals, & etc.		

Chapter Scholarship Fund Account

Balance:		\$ 2,584.38
Deposits:	Flightstar	\$ 50.00
Bills:	DAR expenses	\$ 879.31
Balance:		\$ 1,655.07

Duly reported by Dave Armando, Treasurer

Construction Corner *by Greg Prentiss*

This month's Construction Corner presentation is by Jack Hilditch.. This is a two part article which will be concluded next month.. The first installment discusses powder coating, it's applications and opinions for and against.

The Powder Coating Debate

Jack Hilditch–EAA Chapter 166

Why did I choose Powder Coating as a topic?

I happened to be present, over the past year, at two hanger flying sessions when the subject of powder coating came up in conversation. Each time powder coating was mentioned, the group seemed to become polarized either for or against using it. I came away from both conversations not knowing whether (or when) powder coating was safe to use, or if it was an FAA accepted coating system. My curiosity was piqued so I began to dig a bit deeper and eventually decided to use it as a subject for an article after discussing it with a few chapter members when we visited Connecticut Corsairs. The following is what I found.

What is Powder Coating?

Powder Coating is a high-performance alternative to galvanizing. Low molecular weight solid resins are subjected to elevated temperatures that cause them to melt, flow and chemically cross-link within themselves to form a tough, attractive and consistently finished protective coating. Powder coating provides resistance to abrasion and long-term corrosion protection that adds service life and aesthetic value. Powder coatings provide durable, attractive finishes. Powder coat colors are chemical, corrosion, and abrasion resistant. They can also enhance aesthetic appeal.

Powder Coating Application

Powder Coating guns apply a negative electrostatic charge to the flour-fine powder (that magical mixture of "pigment and resin"). This charge is high voltage; up to 25,000 volts (100,000 volts on industrial guns), but fortunately very low amperage (the amps are the part of electricity that can really hurt you). Since this powder is made of resins, we know that it falls in the general classification of "plastics". As a member of the plastic family, it is a poor conductor of electricity. Once the particle is charged, it gives up that charge very reluctantly. This is what causes the powder to "cling" to the substrate being coated. The negative ions in the particle slowly fight their way to the positively charged substrate. This slow flow of ions from particle to

substrate is what holds the particle on the substrate. Putting it another way, think of the positively charged substrate as "sucking" the negative ions out of the particles causing them to stick. The finished product is a uniform barrier coat. Powder coating can be used on steel, zinc, aluminum and other materials. The quality of the finished product has the ability to outlast and outperform painted parts, when applied correctly. A wide variety of powder coat colors are available. A well prepared and applied powder coat will resist acids, solvents, impact, and abrasions.

Strong opinions connected to the subject – For & Against

Opinions (FOR)

- Powder Coating is more durable than liquid coating systems
- Powder Coating is more environmentally friendly than liquid systems because it does not use volatile organic compounds (VOCs) that are vented into the air. When powdered materials used in Powder Coating operations reach expiration date, disposal is clean and non-toxic. The material is spread on a surface, baked to a finish and then broken up into flakes or hardened material to be disposed of. No chemical process is required.

Opinions (AGAINST)

- Powder Coating hides cracks and structural flaws from dye penetrant testing.
- When Powder Coating is 'green' after application, it can stretch and mask a structural failure.
- Heat (350° F) used in the Powder Coating process negatively affects the metallurgy of the piece being coated. Powder Coating can mask oxidization until too much damage is done.

Information sources:

I contacted a number of sources for information about the subject while researching this article. At the top of my list was Joe Gauthier. Based on conversations with Joe about other subjects, I believe him to be conservative in his acceptance of new technology, and rightfully so. I figured that, if there were concerns about using powder coating on aircraft, Joe's broad experience would have alerted him to them. I believed that Joe's concerns would prepare me to focus on specific topics when I spoke to other sources. My intention was to be fair and as unbiased as possible when presenting different sides of the story. I did not want to 'sugar coat' legitimate concerns, nor did I wish to dismiss a validated

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Amateur-built category 'must be preserved'

By David Sakrison



Garry Kingma with his 51 percent rule qualifying Sonerai II.
Photo by Phil Weston

The FAA's Amateur-built experimental aircraft category must be preserved, so that individuals can continue to build their own airplanes for "education and recreation." That was the strong consensus at a meeting of the Amateur-Built Experimental Aviation Rulemaking Committee (ABE-ARC), a working group of FAA and industry leaders who are addressing issues relating to the ABE rule, on Thursday at EAA AirVenture.

At past ABE-ARC meetings, FAA officials have voiced serious concerns over abuses of the "51 percent rule," which says an aircraft cannot qualify for amateur-built certification unless the owner/builder has completed at least 51 percent—"the major portion"—of the work of building the aircraft. Paul Fiduccia, president of the Small Aircraft Manufacturers Association (SAMA), noted that the definition, interpretation, and verification of the "major portion" clause have been an issue since the rule was issued.

More recently, said John Hickey, FAA's director of aircraft certification, "We have experienced an evolution in amateur-built aircraft, into something that is not part of the original intent of the rule.

"I am an absolute believer in the amateur-built rule," he added, "and we [FAA] are going to do everything we can to support it." But, he said, "We're working up to a situation where people are not building their own airplanes. I cannot accept a policy that would support amateur-built aircraft certification for airplanes that are not built by their owners."

It was admitted that there are a lot of people buying airplanes in the amateur-built category who never touched their airplanes during construction—a clear abuse of the 51 percent rule. The committee's goal, they agreed, is to preserve the 51 percent rule, avoid abuses, and not hurt builders who unknowingly violate the "major portion" clause.

The FAA needs to provide clear guidance on what "51 percent" means and how to compute it, Hickey told the group. "I want to look for a policy that is clear and transparent to the industry, to builders, and to inspectors."

Dick VanGrunsven of Van's Aircraft, Lancair General Manager Tim Ong, SAMA Executive Director Paul Fiduccia, and others noted that the critical issue for the ABE-ARC and the 51 percent rule—the "sticking point"—came down to the question of how to measure 51 percent of the work on an amateur-built aircraft. There is currently no single standardized accounting system for assigning credit for work to the builder, the kit manufacturer, or both. Hickey cited FAA's particular concerns with quick-build kits, in which major assemblies are completed by the manufacturer, and about composite kits, for which major composite components are virtually always fabricated by the manufacturer.

"I want us to work together and come up with an accounting system that is transparent and that we can defend," he said. Hickey assured the manufacturers that he is looking to the expertise of the ARC members for ways to preserve the 51 percent rule. "I don't know what the answer is; I'm asking you guys to come up with a proposal." But at the end of the day, he said, some kits might not meet the 51 percent test.

As for abuses and misapplications of the 51 percent rule, Hickey said, "I'm concerned that if we don't police this properly, we are in danger of losing the entire rule."

SAMA's Paul Fiduccia outlined several possible ways to prevent abuse of the 51 percent rule, including the creation of a Kit Evaluation Team (KET) within the FAA that would have the expertise to evaluate kit manufacturers and commercial

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Must Be Preserved *(continued from page 5)*

builder assistance programs for compliance with the rule. Other items suggested by SAMA included clear guidance on situations that might not meet the "recreation and education" intent of the rule; more detailed disclosure by builders about commercial builder assistance they have received; and changes in the builder's task list and aircraft inspection process to prevent fraudulent claims by "builders" who haven't actually built their aircraft.

FAA officials want the kit manufacturers to continue working on this with the support of the agency. In particular, tell the FAA what companies do to comply with the 51 percent rule. If it's legally defensible, that's what they're looking for.

"We need you to give us a few more months to work on this," EAA's Earl Lawrence told the FAA officials. In response, Hickey said that he is being pressured by his superiors to come up with a solution, "but I will tell them we need more time."

Powder Coatings *(Continued from page 3)*

technology based on rumor and innuendo.

I followed my conversation with Joe by asking FAA personnel from the local FSDO, and at AirVenture, about policies and regulations governing the use of powder coating on GA aircraft, specifically experimental aircraft. I discovered that there appear to be no specific regulations covering powder coating in that venue.

FAA sources interviewed for this article were unable to cite specific Federal Regulations governing the use of powder coating on General Aviation aircraft parts. They indicated that acceptance could be subject to interpretation by individual inspectors at different FSDOs. There appears to be no 'hard and fast' rule currently being used by inspectors in determining acceptability.

I then emailed Builders Assistance at EAA and asked for their opinion. Joe Norris of EAA Aviation Services wrote back with the following:

"There are no regulations that would prohibit Powder Coating on any structure in an aircraft,

especially an experimental aircraft. And I don't know of anything in the Powder Coating process that would be of concern. However, the jury is still out on whether or not Powder Coating is a good idea or not. Powder Coatings do have the potential to hide cracks and corrosion. The coating is somewhat flexible, so it has the potential to "bridge" cracks rather than cracking with the underlying metal. It may also hide corrosion."

"For these reasons, my opinion is that Powder Coating is not the best choice for primary structure of an aircraft. I personally wouldn't use it on a fuselage, engine mount, tail surface, or landing gear. Again, this is my opinion. There is no "official" statement to this effect from the FAA or any other source."

I continued to ask owners who have used Powder Coating and A&P mechanics at several local airports for their opinions.

Opinions were all over the chart and seemed to reflect each individual's predisposition on the subject as I found in the early hanger flying sessions.

Next I spoke with Richard Cyr at a local coating firm (Plas-Tec Coatings, Inc.). Plas-Tec is a contractor that applies powder and other coating systems to defense and aviation projects. Richard said that while naval projects are closely regulated, and have specific paperwork requirements, aviation applications, particularly GA, do not. Richard recommended I speak with North East Helicopters at Ellington airport about their experiences with powder coating. Plas-Tec has been powder coating NEH helicopter parts for several years. Richard addressed my list of negative concerns with the following answers:

Powder coating was better than any paint in applications where paint was appropriate.

A 350° (F) curing temperature should not adversely affect the metallurgy of parts being coated (to his knowledge). He does caution that, if there is a concern, one would be prudent to consult with a metallurgist prior to coating specific parts.

Oxidization (rust) will not occur if microporosity is addressed. That can be done by applying a zinc-rich primer product in advance of the top powder coat. Interior oxidation in airframe structural tubing can be addressed by dip immersion pre-treatment in which a chromating

Powder Coatings *continued*

and/or phosphating process is usually employed.

There is no "green" (or soft) period associated with powder coating. Once it comes out of the curing oven and cools, the membrane is set and hard. The hardened powder coating will not stretch sufficiently to hide underlying cracks, although it may have a different modulus of elasticity than the metal it covers. Paint membranes would react in a similar fashion.

(Author's Note: This would seem to contravene what Joe Norris from EAA had to say so, once again, there is a difference of opinion on the subject.)

It is imperative that preparation be thorough and the process be handled by professionals. Even the slightest oil (from hands, for example) can cause the bonding process to fail.

The powder coating bond is commonly tested by tapping on the finished coat with a round aluminum rod. The powder coating membrane will chip off if the bond is imperfect. Under-curing is also possible if the curing temperature, oven time, or a combination of those elements is not to specification. Cure is normally tested by powder coating operators when they dig a thumbnail into the fresh powder coating membrane as it emerges from the oven. This is a skill learned over some time and what to look for, or feel, may not be immediately apparent to the casual observer. All powder coating operations are checked by chemical tests that far exceed the 'rule of thumb' employed by the powder coating operators.

No Federal Regulations apply to powder coating with regard to FAA application. Military application requires a VIR or Vendor Information Request be submitted to change from a paint coating to a powder coating but those regulations have not caught up with GA or the FAR/AIM.

http://www.boeing.com/companyoffices/doingbiz/dps/3_02.pdf

I visited NEH and spoke with the owner/head mechanic who explained where, and when, the firm employs powder coating.

NEH uses powder coating on small, non-rotating parts with good luck. Typical powder coated

parts are skids, rocker arm covers, some fuselage tubing parts and, in general, any parts that would normally suffer surface coating abrasion during normal use.

Most important is adequate preparation. **Every part is stripped to bare metal**, visually inspected, and die checked or magna-fluxed by company mechanics **before** being sent to the powder coating shop. At Plas-Tec each part is cleaned again and professionally prepared for powder coating by Plas-Tec employees.

NEH believes the cost for powder coating is about the same as Awlgrip or Imron painting, if the stripping and inspection steps are carried out by in-house personnel. When asked why they chose powder coating for specific applications, they said it has a longer life and is more resistant than paint coatings when subject to abrasive conditions.

The NEH rule-of-thumb, and recommendation, is to use common sense when deciding what parts to powder coat.

Finally, they said that they know of no prohibitions against using powder coating, even on rotating parts but, within the rotary wing industry, it is common practice not to apply powder coating to rotating parts.

NEH uses powder coating on the following items, among others:

- Instrument panels
- Valve covers (paint usually flakes off the inside)
- Dip Stick
- Yokes
- Alternators
- Induction Pipes
- High temperature ceramic coating on exhaust systems (inside & out.)
- Skids
- Some structural tubing

Next month Jack discusses his findings, cautions and conclusions.

CALENDAR OF EVENTS

Meetings

August 26
September 30
October 28

No Meetings
July, December

Events

Fly-In	HFD	Sept 15
AOPA Conference	Hartford	Oct 4,5,6
Fly-Out-Flight Design	Woodstock	Oct 13
Annual Meeting	State Armory	
	Officers Club	Nov 9

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