February 2017

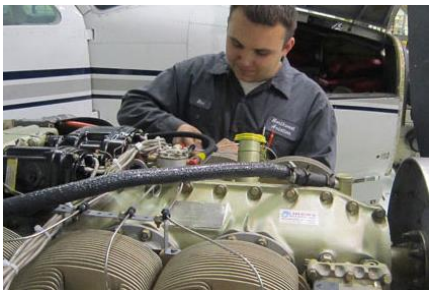
EAA CHAPTER 145

SINCE 1962

Brunch Meeting: Saturday, February 11, 2017 – 10:00 am
Riverview Airport (08C) in the meeting room

CHAPTER MEETING

Jim Yearsich of G&N Aircraft will be presenting this month. They are specialists in Lycoming & Continental engines. G&N is located on Griffith Airport (05C) in Indiana.



http://gnaircraft.com

INSIDE THIS ISSUE

A big thanks goes out to Terry Hallett of Hummel Aviation for making the cold drive up here to show off the Hummel H5. The Hummel designs are efficient, and affordable way to get in the air. They have an Open House for the Hummel on July 1st, and a Williams Airport Fly-In on July 4th (0G6)

www.flyhummel.com **www.hummelengines.com**

Reminder == DUES ARE NOW BEING COLLECTED ==

Dues of $35.00 are payable to "EAA CHAPTER 145" and can be mailed to Bob Swietek at the address listed at the end of the newsletter or brought to the monthly chapter meeting. If you need to make any updates on your contact information, please include the tear-off slip for member data update with your payment.

DOCUMENTS FOR HOMEBUILDING

What records must I keep to document the construction of my homebuilt aircraft?

Answer: There is no "standard" or "official" form for the builder records (commonly known as the "builder's log"). The records can be in any form the builder chooses. Our experience has shown that a three ring binder with some loose-leaf pages and some pocket pages (for pictures) works very well. Some builders use a spiral bound notebook, which also works well. Some builders even use their computer and keep all the records electronically. This is acceptable, so long as the records can be made available to the inspector at the time of the final inspection and can be printed out if necessary.

The only requirement is that you do indeed keep records of the construction of the aircraft. The FAA only considers the tasks a builder completes, not the time spent building, so your builder records should record the tasks you accomplish. However, while it's not required for certification of your homebuilt, you may still wish to track the time spent building, as this experience can later be applied toward the field experience required for an A&P mechanic certificate. Any commercial assistance you pay for should be documented in your builder's log and made available to the FAA inspector upon request.

You can use the FAA's own checklist as part of your builder records, to record which tasks you complete. This checklist is entitled Amateur-Built Fabrication and Assembly Checklist 2011. It can be found in FAA advisory circular, AC 20-27G. You can find these advisory circulars on the FAA's amateur-built website.

FAA guidance (FAA Order 8130.2F, Chg. 4) recommends that pictures be included in your builder records. Lots of pictures are a plus, especially pictures showing you actually working on the project. The purpose of the builder records is to verify that amateur builders did indeed build the aircraft, so the FAA inspector or Designated Airworthiness Representative (DAR) appreciates pictures of the amateur builders actually working on the project.

In addition to the Builder's Log, the builder can document the project in a number of ways including:
(1) Photographs/video/DVD (with the builder in the photo)
(2) Drawings
(3) Engineering data when necessary
(4) Relevant documentation (e.g., plans) and references (e.g., handbooks) used
(5) Documentation concerning any commercial assist
(6) Documentation concerning any non-commercial assistance used
(7) Part inventories and histories
(8) Receipts, Catalogs

AMATEUR-BUILT FAB & ASM CHECKLIST

The purpose of the FAA checklist is to determine whether an amateur-built aircraft constructed from a kit can meet the "major portion" requirement of Title 14, Code of Federal Regulations (14 CFR) § 21.191(g). The primary tool to determine major portion is the Amateur-Built Fabrication and Assembly Checklist (2011). See FAA Advisory Circular (AC) 20-27, Certification and Operation of Amateur-Built Aircraft, for a copy of the checklist.

Determining major portion at time of airworthiness is a difficult and time-consuming process because the amateur-built aircraft is complete and, according to FAA requirements, ready for flight. This status complicates matters and makes the major portion determination more difficult but not impossible.

The Fabrication/Assembly Operation Checklist, FAA Form 8000-38 was revised in 2009. The new checklist has 4 columns versus 2 columns and credit for each itemized task can be incrementally awarded as a ratio or percentage of task completion to reflect who performed how much of the task.

FABRICATION AND ASSEMBLY TASKS	A	B	C	D
	Mfr Kit/Part/Component	Commercial Assistance	Am-Builder Assembly	Am-Builder Fabrication

A primary reason for implementing the new checklist was to eliminate the "all or nothing" methodology previously used that frequently provided full credit to be awarded to the amateur-builder for performing a minor fabrication task such as sanding, drilling and trimming. This checklist is the primary tool used by the NKET when evaluating an amateur-built kit at the manufacturer's facility.

The scores allocated to the kit manufacturer and the amateur builder columns are totaled at the bottom of the checklist in a Summary Section. They reflect the relative portions of the aircraft fabricated and assembled by the kit manufacturer, the amateur builder or the company (if any) providing commercial assistance. At the end of the A/W inspection, the amateur builder must accumulate, through combination of the totals of column "C" and "D," a score greater than 50%.

"**DETERMINATION OF MAJOR PORTION**. The determination of major portion is made by evaluating the amount of work accomplished by the amateur builder(s) against the total amount of work necessary to complete the aircraft, excluding standard bought items. The major portion of the aircraft is defined as more than 50 percent of the fabrication and assembly tasks, commonly referred to as the "51-percent rule." An aircraft is not eligible for an experimental amateur-built certificate under § 21.191(g) if the major portion of the aircraft fabrication and assembly tasks are not completed by an amateur builder(s)."

"**FAA Use of the Amateur-Built Fabrication and Assembly Checklist (2011).** The Amateur-Built Fabrication and Assembly Checklist (2011) is to be used by the FAA as an aid in determining compliance with the "major portion" requirement of § 21.191(g). The Amateur-Built Aircraft Fabrication and Assembly Checklist (2011) must be used when—
(1) Performing FAA kit evaluations by the NKET to determine if an aircraft fabricated and assembled from a kit may meet the major portion requirement of § 21.191(g).
(2) Commercial assistance was used by the amateur builder(s) during construction.
(3) The amateur builder made modifications to an aircraft kit included on the FAA List of Amateur-Built Aircraft Kits that potentially affects the major portion determination.
(4) The aircraft was built from prefabricated major components that are readily available from aircraft parts suppliers, other than those components listed in paragraph 149a **(2).**
(5) The aircraft was built using any salvaged components or used parts from aircraft that have been type certificated. For additional details and limitations affecting this practice, refer to paragraph 149b through d below.
(6) The aircraft was built from a kit that has not been evaluated or found eligible by the FAA.
(7) Providing guidance to a kit manufacturer to determine if a proposed amateur-built kit may meet the major portion requirement of § 21.191(g).
(8) There are questions that arise as to the determination of major portion."

Clarification for notation **(2)** above is found in the following paragraph entitled "Use of Commercially Produced Products and Articles," in the same order states:
"Items such as engines, engine accessories, propellers, rotor blades, rotor hubs, tires, wheel and brake assemblies, instruments, and standard aircraft hardware, including pulleys, bell cranks, rod ends, bearings, bolts, rivets, hot air balloon burners, and fuel tanks, are acceptable and may be procured on the open market. The use of these items is not counted against the amateur builder or kit manufacturer when the FAA determines whether the amateur-built aircraft has met the major portion requirement."

The components listed in the above paragraph are considered non-checklist items and no credit is assessed against the manufacturer or builder for their use in building the aircraft.
The following excerpt from AC 20-27 reiterates the same concept for the amateur builder.

"Purchasing Prefabricated or Assembled Components and Materials.

To meet the intent of § 21.191(g) and to be eligible for an amateur-built experimental airworthiness certificate, you need to present satisfactory evidence to show that the aircraft was not fabricated and assembled from completely prefabricated parts or kits. However, the FAA does not expect you to fabricate every part that makes up the aircraft. Items such as engines and engine accessories, propellers, landing gear, rotor blades, rotor hubs, tires, wheel and brake assemblies, instruments, and standard aircraft hardware (such as pulleys, bell cranks, rod ends, bearings, bolts, and rivets) are acceptable and may be procured on the open market."

The use of commercial assistance for non-checklist items does not, by itself, trigger the requirement to use the new Amateur-Built Fabrication and Assembly Checklist (2011).

Fabrication and Assembly

FAA Order 8130.2 defines fabrication as: "To perform work on any material, part or component, such as layout, bending, countersinking, straightening, cutting, sewing, gluing/bonding, lay-up, forming, shaping, trimming, drilling, de-burring, machining, applying protective coatings, surface preparation and priming, riveting, welding or heat-treating, transforming the material, part or component toward or into its finished state. "

The FAA does not define "assembly." However, such work that does not fall under the definition of fabrication is considered assembly. In work such as riveting, there can be some confusion concerning different components. The guidance this guide offers depends on the component, task at hand, and how it is being applied. When attaching a metal skin to a basic wing structure (i.e., the spar and ribs forming the basic wing structure) the riveting that fastens the skin to the ribs should be considered assembly work, not fabrication.

However, consider a different major component found in almost every kit – the firewall. The NKET has observed that most of the amateur-built kits provide the individual firewall components, including the sheet metal, angles, uprights, doublers, nut plates, etc. Usually these parts are cut to approximate size but require significant work to transform into a finished component. This involves a lot of riveting besides the requisite drilling, trimming and deburring found in most of the other parts. These actions will be attributed to the fabrication task for the firewall, not assembly. The assembly task will be used when attaching the firewall to the fuselage. Incidentally, the firewall tasks were inadvertently left off of the checklist at inception. The NKET has added them to the Propulsion section at task P28 and P29.

Most of the credit awarded to the builder of an amateur-built kit, especially in quick build kits, will be for assembly tasks.

Commercial Assistance

FAA Order 8130.2 refers to commercial assistance in the paragraph entitled, "Providing Commercial and/or Educational Assistance" as "any fabrication or assembly tasks contracted to another party (that is for compensation hire) or provided by a commercial assistance center" and also in the notes for the "Use of Prior Policy" flowchart as "commercial assistance means to provide assistance with fabricating or assembling amateur-built aircraft for cash, services, or other tender. This does not include one builder helping another without compensation."

AC 20-27 defines commercial assistance as "providing assistance with fabricating or assembling amateur-built aircraft for cash, services, or other tender. This does not include one builder helping another without compensation."

For checklist tasks where the builder has indicated that commercial assistance was used, a credit allocation must be made for proper division of work. In many instances, the allocation may be very simple when the builder indicates that the entire task was contracted for. However, if this is not the case, then the following must be applied: The original condition of a component or task prior to commercial assistance must be ascertained (usually with photographic evidence), then the builder's contribution to completing the task, if any, must be determined, before the ratio of work attributed to commercial assistance can be determined. Remember to apply the following instructions and evaluative process to all task items, no matter who completed the task (the builder, the manufacturer, or a commercial assistance provider), and the result will be acceptable.

Credit Allocation

Credit allocation for each individual task involves a simple decision process. The important factors are deciding which column properly receives the credit (Manufacture, Commercial assistance or Builder), and how much credit (e.g., full points or incremental portion such as 1/10th) is actually allocated. One methodology the NKET has adopted is to apportion the credit allocations according to the table below, which uses the amount of work involved to complete the task as a metric.

Minor level work	0.1 to 0.2 point
Medium level work	0.3 to 0.5 point
Major level work	0.6 to 0.9 point
Completely fabricated from raw materials or complete assembly	1.0 point (full credit)

		A	B	C	D
FABRICATION AND ASSEMBLY TASKS		Mfr Kit/Part/ Component	Commercial Assistance	Am-Builder Assembly	Am-Builder Fabrication
W13	Fabricate Wing Tips	0.9			0.1
W14	Assemble Wing Tips to Wing	0		1.0	
W15	Fabricate Special Tools or Fixtures	1.0			0

In this instance, the scores for tasks W13 and W14 in the standard kit should be identical to the quick build kit components and assembly work. The builder receives the wing tips from the factory complete with only some trimming, and drilling to perform before attaching to the wing. In task W15, in the standard kit, the builder receives credit for building the wing cradles out of plywood, for assembling the wing leading edges and the main wing skin.

By utilizing this methodology for task evaluation, an evaluator can more precisely and fairly allocate the proper credit to each application. For example, sanding, drilling, and deburring applied to a component provided by a manufacturer, (i.e., drilling a few holes and deburring the edges); a minor credit of 0.1 or at most 0.2 is warranted.

If the amount of work is more significant (e.g., cutting, drilling, trimming, deburring, and other minor applications), a medium credit of 0.3 or 0.4 may be fair. In those instances where the amateur-builder conducted a greater amount of fabrication such as cutting tubing, trimming the ends, sanding it, bending it and drilling attach points, a major credit can be allocated, such as 0.6 or 0.7 points. If the builder creates a component from raw materials using a drawing, then and only then may a full credit of 1.0 point be awarded

in the fabrication column "D" on the checklist. For example, if a raw material like aluminum sheeting is provided by the kit manufacturer, and the builder measures, marks, cuts, trims, bends, forms, deburs, and drills the material to form the wing skin, the builder would receive the full credit for fabricating the skin. As stated above, the builder in most instances is awarded full credit for assembly tasks, unless he used commercial assistance.

As previously discussed, the NKET uses the checklist to record the amount of fabrication and assembly accomplished by a kit manufacturer. This documents a starting point for the amount of fabrication and assembly available towards completion of the aircraft kit for the amateur builder. The checklist may also be used if an amateur builder has constructed an aircraft either from plans/scratch or by using a purchased kit that is not included on the FAA List of Eligible Kits previously evaluated. Listed kits have been determined through evaluation to allow an amateur-builder, following the instructions in the manufacturer's manual, to meet the major portion fabrication and assembly requirement of § 21.191(g). Additionally, by using the checklist, a kit manufacturer can estimate whether a proposed kit would allow a builder to meet major portion requirements. If this benchmark is not reached, the manufacturer can then adjust the kit contents or configuration to meet the major portion requirement.

The NKET has benefited from multiple practice sessions and group meetings to discuss the procedures and methodology to apply in estimating and awarding the proper amount of credit for tasks on the checklist. Even more important, the NKET onsite evaluation takes place at the manufacturer's facility with the kit in its "as sold configuration" status with each individual component supplied in the kit laid out in a hangar bay or work shop for easy access and inspection by the team. The NKET evaluators also have the benefit of discussing the construction project, plans, drawings, and builder's manual with the company technician while on site.

Onex-Standard Kit

FABRICATION AND ASSEMBLY SUMMARY	A	B	C	D
	Mfr Kit/Part/ Component	Commercial Assistance	Am Builder Assembly	Am Builder Fabrication
1. Total Number of Aircraft Tasks (Note 1)	(SUM#1)		117.00	
2. Total Points for Each Category. (Note 2)	39.5	0.0	60.3	17.2
3. Total Points for Complete Aircraft Construction (SUM # 2 should equal SUM # 1 above). (Note3)	(SUM #2) ►		117.0	
4. Percentage of Each Category as Part of Total Aircraft Construction. (Note 4)	33.76%	0.00%	51.54%	14.70%
5. Total Percentages for Complete Aircraft Construction (Add all percentages in row 4) Total should equal 100% (± . 5%). (Note 5)		100.0%		
6. Total Builder Points – Add points in row 2, column C and D only, together. (Note 6)			77.5	
7. Total Builder Percentage – Add percentages in row 4, columns C and D only, together. (Note 7)			66.24%	

Amateur-Built Fabrication and Assembly Checklist (2011) Fixed Wing
www.faa.gov/aircraft/gen_av/ultralights/amateur_built/kits/media/AmBuiltFabAssyCklistFW.pdf

Job Aid for filling out builder's checklist:
www.faa.gov/aircraft/gen_av/ultralights/amateur_built/kits/media/Am_Blt_Chklist_Job_Aid.pdf

When you are ready to pull the trigger, the EAA store has an "Amateur-Built Certification Kit" for $20. The kit includes everything you need to register and certificate a new experimental amateur-built aircraft. The kit also includes all FAA forms, an "Experimental" sticker (in black), a dataplate, and a convenient placard decal sheet.

KALAMAZOO AIR-ZOO OPEN COCKPIT WEEKEND

(note: at time of printing, Air-Zoo did not post what airplanes are open, so check the Air-Zoo website for updates)

The Kalamazoo Air-Zoo Museum opens up some of the cockpits of selected aircraft in the month of February. See the following list for the dates & aircraft. Entry to the Air-Zoo is Adults = $15.50 Seniors 60+ yrs = $12.50 Children 5-18 yrs = $14.50 Children 0-4 yrs = FREE Military/Veteran Discount = 50% off

February 3, 4, 5	**???**
February 10, 11, 12	**???**
February 17, 18, 19	**???**
February 24, 25, 26	**???**

AIR ZOO

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UPCOMING EVENTS

Feb 4	Canton/Plymouth (1D2)	EAA #113 – Fly-In Chili / hot dogs
Feb 11	**Riverview Airport (08C)**	**meeting – G&N Aviation(Lycoming) Jim Yearsich**
Feb 18	OSHKOSH (KOSH)	EAA Skiplane Fly-In & Chili
Mar 11	**Riverview Airport (08C)**	**meeting – Bob Aardema, A-10 Warthog**
Apr 8	**Riverview Airport (08C)**	**meeting – Homebuilding Paperwork/Records**
July 1	Williams Co (0G6)	Hummel Aviation Open House
July 4	Williams Co (0G6)	Williams Co Airport Fly-In

If you know of events that should be on the event calendar, please e-mail them to me
If you would like to be on the e-mail list for meeting and event reminders, or if you would like to receive the newsletter electronically, which is full color and delivered days before the print version… please send your e-mail address to: randall.houtman@dematic.com

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Treasurer's Report: (As of Jan 31)

Liabilities: $3500.00
Cash: $111.75 Checking: $136.69
Savings: $4545.02 Total: $4720.11

Website Editor, Bill Willyard
(wgwillyard@att.net)

EAA CHAPTER 145 MEMBERSHIP APPLICATION / RENEWAL FORM
DUES ARE $35.00 PER YEAR – JANUARY 1st to DECEMBER 31st

Name _____
Co-Pilot / Spouse _____
Address _____
City _____
State / Zip _____
e-mail address _____
Home Phone _____
Work Phone _____
National Membership # _____

Aircraft Owned _____
_____

Projects / % Compete _____
_____

Bring this form to the next meeting or mail to:

EAA Chapter 145 Treasurer
6962 Bridgewater Dr. SE
Grand Rapids, MI, 49546