



# FLYPAPER

EAA Chapter 18, Milwaukee, WI

Year 51, November 2012

[www.eaachapter18.org](http://www.eaachapter18.org)

## HEADLINES!

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- November is Chapter elections month. If you don't attend the November meeting, there is a pretty good chance you could be chapter president in January :). There are several positions up for election. Fred Keip, Tony Phillips, Tom Stranak and Joe Ptaszek will not be up for re-election. Joe Ptaszek will also step down as Coffee maker.
- December 12 @ 6pm is our Christmas Banquet at Del Fuegos in Milwaukee (909 W. Layton Ave). Come on out, everyone will "go Dutch" and it's always a good time. Also, remember there is no regular meeting this month.

## Illustrated Guide to Engine Hanging

By the Tampa RV Builder's Group

Jim Norman, Scott Reviere, Don Hughes, Doug Gardner, and James Samonsky. Used by Permission—submitted by Jim Hatzenbeller

### 1. Introduction and Purpose.

Hanging the engine is perhaps one of the biggest days in the life of a custom-built airplane. It is, however, one of the least illustrated or documented procedures for the home builder, including the RV series of aircraft. This article was prepared to address this need by providing an illustrated guide to mounting a Lycoming engine on your plane. When this procedure is followed, you should expect the engine to be hung in less than one hour. The 5 builders authoring this article have installed 4 engines on RVs within the last 4 months, each time learning subtle tricks decreasing our mounting time from just under one hour for our first one, to the



case illustrated here which was completed in 37 minutes. We have documented every step with a digital camera and have labeled the photos for clarity. It should be obvious, however, that differences exist for every plane and every engine, and this article is simply meant to be instructional. We do not claim to be professionals and cannot be held accountable for the accuracy of this information or how you use it as you install your own engine.

### 2. What We are Installing, and Left vs. Right.

The engine used in this illustration is a Lycoming IO-360 B2B. It is shown in the top right photo as delivered in May, 2001. This engine was custom built for me (Jim Norman) by Aero Sport Power. A group of Tampa builders have come to my house to help install it on an RV-6A, however this exact sequence has been used to hang similar O-360s on the other author's RV-6, RV-6A, and RV-8A. The experience discussed in this article is primarily from the others in the group, I just happen to be the guy who is putting this combined experience on





## PRESIDENT'S CORNER- JEFF POINT



President's Rant- November 2012

Welcome to the November Flypaper. Wow, where do I start? Most months, as I sit down to turn out a little prose for the newsletter, I find myself staring at the monitor, wondering what to write about. This month, I've got enough material to work with to write a book, let alone a column, and now my problem is to get it down to a manageable size. So, here goes.

Let me start with a little good news (good for me, anyway.) As many of you know, I have been grounded and my airplane has been in mothballs for the last year and a half, following an eye surgery. After getting a clean bill of health from my doctor, I started the paperwork process with the FAA, and last Friday I finally got The Call from the FAA that my third class medical was approved. Of course, after that much time, I had a few other issues to take care of before I could fly, little things like an airplane way out of annual, a BFR way out of date, and no insurance on the plane. Fortunately I had the good sense to start working on these things a couple of months ago, so that when The Call came, I was good to go, and a week later, I sipped the surly blondes for the first time in a long time. And yes, it felt good to be back in the sky.

The last month has seen a couple of other major developments involving people (other than yours truly) with the word "President" in their title. Unless you have been living under a rock, or in self-imposed exile in your workshop, you have heard about the sudden resignation of EAA president Rod Hightower back in late October. While all the usual things were said surrounding his departure (ie. for family reasons) it was obvious to anyone who has been paying attention, that Rod was shown the door. Now, I've met him, I think he's a good man and I wish him well in his future endeavors. However, it is undeniable that he was not the right person to lead this organization as it moves forward, and the right decision was made to replace him. As of now, chairman-of-the-board Jack Pelton has taken over the day to day duties while a search is conducted for a new president. Now, it was just a couple of years ago that we spent a lot of time and money on the search process that eventually resulted in the hiring of Rod Hightower. It is my sincere hope that the board learned a few lessons during this process, and that it takes these lessons to heart and avoids making the same mistakes.

Over the past year, and certainly in the weeks leading up to, and at Oshkosh this year, a certain sense of, dare I say, "malaise" seemed to have



Continued on page 3

PRESIDENT'S CORNER- JEFF POINT *CONT'D*

settled over the organization. From the controversial personnel moves, to the perceptible change in direction away from the core mission, to the void in leadership and communication from HQ, it has not been a good time in the history of this organization. A large number of long time members found themselves evaluating their participation, particularly as it involved Oshkosh and the annual convention. Let me be blunt- a lot of long time volunteers that I talked to were openly questioning whether they would be back next year, and I include myself in that group. The departure of Rod, and the chance to rebuild the organization, has been a significant shot in the arm to the membership, and the general mood has been much higher in the past month. However, it is critical that the board get it right this time around, as another misstep could do damage to the organization from which it may not be able to recover. I am cautiously optimistic.

Back here at the local level, we have a couple more events of note in 2012. The November chapter meeting is coming up on Tuesday the 27<sup>th</sup>, and this being November, it is time for chapter elections. Being an even year, the offices of VP, Secretary and three board positions are open. Fred Keip has decided to retire his position as VP, and Eric Whyte has been nominated to serve in that role. A recent Gallup poll revealed that incumbent Secretary Jim Hatzenbeller is enjoying a double-digit lead in his bid for reelection, but the remaining races are too close to call. This could be down to the wire on election night, so be sure to join us on Tuesday. After Tuesday, our last event of the year is our Christmas Party, on Tuesday Dec. 11<sup>th</sup> at El Fuego restaurant, 909 W. Layton Av. Nothing says Christmas like margaritas and tacos!

Hope to see you all on Tuesday. Until then, keep your airspeed up and mark your ballots with a sharp pencil.

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### ***Engine Hanging cont'd...***

(electronic) paper. When we discuss the Left side of the engine, it will be the side that is on the left when seated inside the cockpit of the plane.

#### **3. Items Needed to Get Started.**

It will be very difficult to mount an engine by yourself, so don't try. Get at least one more person, and ideally 2 helpers. They don't need to know anything about airplanes, but it sure helps if they know the difference between a socket wrench and a boxed-end wrench. Additional items needed are shown in Figures 1, 2, and 3, and are described here:

- Engine Hoist (or Block & Tackle). You can rent this in any town... about \$20/day.
- Mounting Bolts and rubber Engine Mounts. The ones shown were bought from Vans. Each mount consists of 2 black rubber biscuits which are subtly different, an inner cylindrical rod which prevents over compression of the rubber, and one big washer. Note that the four engine mounts are identical, and you need to buy four... they come individually. You will mount the top ones differently than the bottom ones, but none the less, each set is identical. The bolts are close tolerance and are very high quality. They are expensive, but do not cheat here.



Figure 1. Engine Hoist





## ENGINE HANGING—CONTINUED...

The bolts come as a set of 4, with 2 being slightly longer than the other two. The difference in length is only the width of a washer. The longer bolts will be used on the bottom and therefore allow for the use of an additional washer if you have some engine sag with time. The bolts come with two more big washers (slightly smaller in diameter than the one which came with each rubber set) four castle nuts, four cotter pins, and a handful of AN970 washers. There are extras of these (little) washers and are to be used as needed under the castle nuts to get the castle nut where it is appropriate for placement of the cotter pin.

- Tools. Appropriate wrenches and sockets, and a punch (which will be used as a drift pin if it is needed).
- Van's drawing number SK-90A. Read it now, and read it several times during this operation. Take it out of the binder and tape it to the side of the plane.
- Refreshments. If you're going to get some buddies to help out, you better have a well stocked refrigerator... preferably in the garage so they don't have to walk very far. This important concept is illustrated in Figure 3, and has proven to cut down significantly on mounting time.



Figure 4. Engine Preparation.

### 4. Preparing the Engine.

Prior to hanging the engine, there are a couple of things that should be done, and one or two that must be done. In Figure 4 we show the rear of my (JN) engine which has been labeled for some important preparation points.

- The white numbers show the order in which we will be installing the mounts and bolts. The top right is number one followed by top left, then bottom right and bottom left.
- The yellow letters show some of the installations on the accessory case. Letter A is the most important. This is the fitting which will provide a measure of oil pressure. This fitting is nearly impossible to get to after the engine has been mounted, so put it in first. This fitting is a special fitting made for this application and is bent 45 degrees and has a restriction outlet that prevents total immediate oil loss if there is a hose failure down stream. A small hose fits to this fitting that subsequently attaches to a pressure transducer. Importantly, this fitting must be oriented a specific direction or it gets in the way of the mount and/or you can't get your hose on. It is to be pointing down toward the ground and back toward the rear of the airplane. If you have it aimed toward

your right main tire you will be fine.

- The following are less important, but are shown for clarification. Letter B is the Hall Effect Sensor Module for a Lightspeed Engineering Plasma CDI Ignition system which has been mounted in place of the right magneto. This can be mounted later fairly easily, but it is easier to do prior to mounting the engine. Do not, however, have any of the wiring systems attached. Letter C is showing an oil line fitting which goes to the oil cooler. This is easier to put in prior to mounting the engine. The counterpart fitting to Letter C is shown as Letter D; it also will connect to the oil cooler. This is not necessary to put in prior to mounting the engine on the airframe, but it's not in the way either, so put it in if you have it. Note that this engine has the prop governor and cable bracket attached. This can be done later, but it is considerably easier to do prior to hanging the engine, and it lets you look "inside" the black box to see what is happening in there. Also note that this engine has a vacuum pump mounted. This also can wait until later, but it is a bit easier to do prior to the engine being hung. However, note that the vacuum pump does NOT have its inlet and outlet fittings attached (yet). If you are going to mount the vacuum pump before you mount the engine, you need to mount the vacuum INLET pipe first, otherwise you will have to remove the pump to get this fitting on since the motor mount top cross piece will prevent you from screwing this inlet pipe in. These two vacuum pump fittings stand a chance of hitting the motor mount top piece as you align the engine at the very beginning...so be careful not to bend them, scratch the paint, or crack the pump itself when you are first getting started. Our recommendation is to screw the inlet into the vacuum pump and mount the pump prior to mounting the engine, leaving the vacuum outlet fitting until later. However, mounting a vacuum pump is not difficult, so there is no need to fret about this issue, and certainly no need to wait for a vacuum pump to arrive prior to mounting the engine. Finally, you will note in these pictures that the fuel injection has not been bolted onto the bottom intake. Typically Lycoming engines are shipped with the carburetor (or fuel injection) detached from the bottom to make the entire system smaller and therefore cheaper to ship...while also decreasing the likelihood of damage to these sensitive parts. Do not fret this issue. You will install this later when it is easier.



Figure 2. Engine Mounts and Bolts.

- ### 5. Aligning the Engine to the Motor Mount.
- The first real step is to get the engine picked up and aligned with the

## CALENDER OF EVENTS



\*Monthly meetings are always 4th Tuesday of the month at 7:30 PM at the Timmerman CAP hangar.

**October Chapter Banquet** -10/23/12- Banquet, Clifford's in Hales Corners. 6pm.

**November Chapter Meeting**- 11/27/12- Stranak, aerobatic CFI

**December Christmas Party**- 12/11/12- El Fuego, 909 W. Layton av.

### Engine Hanging Cont'd...

engine mount on the firewall. This is quite easy. The only tricky part is to keep some of the accessories just discussed from getting banged up. Figure 5 shows us getting things aligned, with guys on each side making sure the pretty paint doesn't get scratched (on the engine or the mount), or that the vacuum pump doesn't hit the cross piece of the mount.



Figure 6. The First Mount and Bolt.

### 2. The First Bolt.

The first bolt/mount to be installed is the Top Right. Putting this bolt in is not hard at all and can be completed in about 30 seconds. Before you put it in completely, put the rubber biscuits in BOTH top mounts. Don't worry about the bottom rubbers yet... 'cause if you try to put them in, they will fall on the floor...so ignore the bottom rubbers for now and just put the tops in place. Refer now and frequently to Van's drawing number SK-90A. In this picture, the engine is on the left side of the page and the motor mount on the right. As noted briefly above, one of the tricks to this installation is understanding that the slightly thinner mounting rubber biscuit is made of a harder rubber, and is to be mounted in "compression" while the airplane is sitting on the ground. This means

that the thinner rubber biscuit is next to the engine at both bottom positions, and on the rear of the airplane's engine mount (closer to the firewall) at the top two positions. The thick washers will always accompany the thinner, harder rubber biscuits. The big trick at this phase: Tighten this bolt all they way snug (don't get out the torque wrench yet, but tighten this bolt). This pulls the engine toward the right side so that the top left mount will come into alignment. Figure 6 shows the top right bolt installed and tightened down.

### 3. The Second Bolt.

The second bolt to be placed is the Top Left. You should already have the rubbers in place, and this is not much harder than the first bolt. Figure 7 shows this taking place. Note that the engine hoist is still holding ALL of the weight of the engine. When installed, tighten this bolt all the way just like you did the Top Right bolt. If there is any trick to this bolt, it is that the first bolt was tightened down and the engine hoist is used to manipulate the engine up and down a bit while you push on the engine a little from side to side. This should not be hard.



Figure 5. Aligning the Engine.



Figure 7. Installing the Second Bolt.

**JOIN CHAPTER 18 TODAY!**- Still considered the "best deal in aviation" by Chapter 18 president Jeff Point. Fill out the info below and give it to our membership coordinator Ken Klima at the next meeting. (Annual Dues are \$10, plus \$5 for name plate)

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Email: \_\_\_\_\_



## ENGINE HANGING - CONTINUED

### 4. The Third Bolt.

The third bolt is the Bottom Right. This is starting to get a little tougher and now you are going to have to use the engine hoist a little to help align things. First, pick up on the engine a little to allow you to put in rubber biscuits in both bottom mount cups. Remember, now we are putting the harder, thinner rubbers next to the engine, and they are each accompanied by one big washer which goes up against the engine block. The trick here is that you may have to loosen one or both of the bolts you just tightened (the top two bolts). Take a look and see what lines up and experiment a little with loosening the top right bolt a little first allowing the engine bottom to swing a little to the left. Once this bolt gets in, you must tighten it down all the way. The fourth bolt is the hardest, and it won't go in if the right bottom bolt is not tight. Another thing to note is that the first two bolts went in without much trouble. But the third and fourth bolts will need some encouragement from other tools. We recommend that you do not use a hammer to help the bolts into their respective holes. Instead, try "screwing" the bolt into place once it is well lined up, allowing the threads to help pull the bolt into its final position.



### 5. The Fourth Bolt.

The fourth bolt is the Bottom Left and its shown in Figure 8. Once again, be careful of how your biscuits are placed. This is likely the only place that you MAY need a drift pin to help align the hole in the rubbers with the bolt hole in the crank case. The drift pin is NOT to be used to move the engine! You can't move the engine with a drift pin, so don't try! Its only purpose is to help you shift the rubbers a little. Since the rubbers are actually rubber, they will give a little if you pry them, but don't try to pry them from outside (levering against the engine block), but rather simply stick the drift pin through the back of the mount through the rubbers and into the threaded hole in the block (remember, just use a hole punch or Phillips screw driver for your drift pin... nothing fancy. Again, pry the rubbers from the inside metal part only, and only if you have to. We have only had to use this drift-pin technique twice on four engines, but it is helpful. Once you have it aligned, then use another screwdriver on the outside to hold the biscuit in position (levering a little against the block) and insert the bolt. Do NOT pry against the rubber so that you damage it. Also, placing this bolt will most likely require that the other three bolts are tightened down FIRST. The amount that the other three MAY have to be loosened a little bit has varied slightly on our four recent mountings, but start with the assumption that the first three bolts are to be tightened all the way prior to getting the fourth bolt started.

### 6. Remove the Engine Hoist.

Figure 8. Last Bolt.

Now you're done. Stand back, take some photos, and have a refreshing drink. The builders who have provided the expertise for this article are pictured here. The guy with the big letter A on his shirt is me, Jim Norman (RV-6A); Doug Gardner is letter B (RV-8A); C is my dad; D is James Samonsky who has helped build parts of all of our planes; E is Scott Reviere (RV-6A); and F is Don Hughes (RV-6). Note that everybody has a bottle of "refreshment".

Respectfully,

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The Authors.

CHAPTER MINUTES-  
SECRETARY JIM HATZENBELLER



### Chapter 18 Minutes from the October “2012” Dinner Meeting

The October dinner meeting was held at Clifford’s in Hales corners. Happy hour was from 6:00 until 7:00 at which all were seated and dinner was served. At 8:15 the meeting was opened by President Jeff Point.

**Announcements:** At this time, Jeff extended thanks to Stephanie and Dennis Schulko for their efforts in organizing the dinner meeting. Thanks were also extended to the wait staff and bartenders for their service. Thanks were given to Joe Ptaszek for his efforts with the door prizes.

It was announced that the names of Ralph Kuchera and past president Eric Anderson will be added to the memorial plaque. A moment of silence was observed in their honor.

It was announced that 1<sup>st</sup> flight plaques will be given to Brian Krebs for 1<sup>st</sup> flight in his RV-8 and Bob Lang for 1<sup>st</sup> flight in his RV-6.

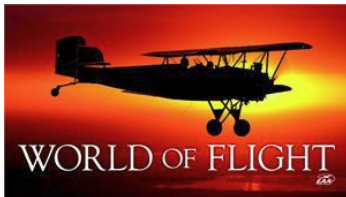
At this time, Craig Henry along with colorful commentary, read off the numbers of the winning tickets for door prizes. Those with matching winning ticket numbers came forward to select their prize until all prizes were gone. Thanks were again extended to Joe Ptaszek for all of his work in making the door prizes a big part of this dinner meeting.

Meeting was adjourned at 8:40pm.

Respectfully submitted, Jim Hatzenbeller (Secretary)



## TREASURER REPORT- TREASURER KEN KLIMA



We have the new EAA Calendars for sale. Bring \$10 to the chapter meeting and help support your local EAA.

### Chapter 18 Apparel



Chapter 18 Apparel is on sale now. T-Shirts, Hats, Coffee Mugs, and much, much more. Order anytime and no minimums. Each purchase will help to support the chapter.

[www.cafepress.com/EAACChapter18](http://www.cafepress.com/EAACChapter18)

| October -2012                  | Checking        | Savings           | Total             |
|--------------------------------|-----------------|-------------------|-------------------|
| Beginning Bal. 10/1/12         | \$1,394.21      | \$1,678.67        | \$3,072.88        |
| <b>Receipts</b>                |                 |                   |                   |
| Banquet                        | 726             |                   |                   |
| Dues                           | 30              |                   |                   |
| Nametags                       | 10              |                   |                   |
| <b>Total Income</b>            | <b>766</b>      | <b>0</b>          |                   |
| <b>Expenses</b>                |                 |                   |                   |
| Chapter picnic                 | -78             |                   |                   |
| Banquet                        | -1152.04        |                   |                   |
| <b>Total Expense</b>           | <b>-1230.04</b> | <b>0</b>          |                   |
| <b>Ending Balance 10/31/12</b> | <b>\$930.17</b> | <b>\$1,678.67</b> | <b>\$2,608.84</b> |

## MEMBER CLASSIFIEDS

### FOR SALE, RENT or LOAN

- I've got a few things for sale that builders and/or pilots might want:
  - 1 case, unopened, of Aeroshell 15W50 \$45
  - 1 case, unopened, of Aeroshell 100W+ \$40
  - 2 Tempest AA48108-2 oil filters \$15/ea or \$25 for both
  - 1 ATS Rivet Tool (204RV) \$80
  - 1 3.5hp oil-sump 135psi compressor w/60gal tank and additional 60gal tank \$600, \* includes 1 large and 2 smal filter/regulators, several hoses, and condensate drain system w/ball valves
  - 1 Survival Products 4-man raft #1400-1/1500-1 \$800 Contact Andy Laures at [alaures@hotmail.com](mailto:alaures@hotmail.com)
- Sonex Airframe Kit #1190 (Standard, Dual, VW) "Easy Build" Laser Cut Metals with Machined Angle Components and Pre-Assembled Main Wing Spars. Some work in progress. Complete Kit cost was over \$19,000, Asking \$18,000. Located at Air Troy Estates (East Troy). Carroll Rands 262-994-9009 or [crrands@yahoo.com](mailto:crrands@yahoo.com)
- Zenith CH200 about 35% finished. The plane is located in the Burlington area and the family wants to sell it. Betty Ashworth [847-502-3034](tel:847-502-3034)
- For Sale: Marvel-Schebler MA3SPA carburetor. P/N 10-3237 for a Continental C-145. \$300. Fred Keip 262-835-7714 (after 6 PM) or [fredkeip@aol.com](mailto:fredkeip@aol.com)

### WANTED TO BUY, RENT or BORROW

- Laurie Probst is looking for some un-airworthy wing ribs for student demos. If you have anything laying around please let her know. [kosalof@aol.com](mailto:kosalof@aol.com)
- Mike Felske is looking for 3-4 un-airworthy metal wing ribs. Contact him at: [wings@wi.rr.com](mailto:wings@wi.rr.com) or [262.379.0251](tel:262.379.0251)



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### **FLIGHT ADVISORS**

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To submit articles, photos or other items for the newsletter as well as ideas, suggestions and corrections, contact Tony Phillips @ [vansrv9flyer@gmail.com](mailto:vansrv9flyer@gmail.com)