



EAA Chapter 21 NEWSLETTER

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February Chapter Meeting Rescheduled

We're going to try something different this month. Instead of having a meeting at our regular time and date, we are going to reschedule the meeting to Saturday, February 28, beginning at 10:00 AM.

Steve Eberhart, our program director, has arranged for Bobby Hester, a friend and fellow RV-7A builder, to visit Skylane and put on a presentation about Slick magnetos, and specifically about complying with the Service Bulletins for them. He

will have a Powerpoint Presentation on that subject. Steve will have his magnetos there for demonstration and reference purposes.

Currently, the plan is for Bobby to fly in to Skylane in the RV-7 he has been flying for about two years now.

Bobby hails from Hopkinsville, Kentucky, and is employed as a A&P mechanic who works on Blackhawk helicopters at Fort Campbell, Ky.

Hugh Gerhardt, Our New Treasurer

Our new Chapter Treasurer for 2009 is a relatively new member, Hugh Gerhardt. Hugh lives on Heim Road, just over the Warrick County line, near the R/C aircraft flying field east of I-164. He lives there in the house he grew up in, but lived near Holland, Michigan for several years, returning to his childhood homestead in April of last year.

Hugh's interest in flying is a fairly newfound interest. When his son started taking flying lessons in Michigan just a few years ago, Hugh started watching the King and Sporty's DVDs he brought home. That's when the flying bug really bit. He met some fellows there through his son's flying activities, and learned of the EAA chapters in Holland and Grand Haven, Michigan. He started attending their meetings. "They had 30 or 40 guys crammed into half a hangar," he told me. "They built a lot of airplanes there; it was a building chapter. They had all different ages and experience levels—a really interesting group."

Hugh first visited Oshkosh in 2006. "I had no idea it was as large an organization as it was," he said. It is (so far) the only time he has been there. While there, he picked up a Sport Pilot student pilot certificate for himself. He doesn't plan to stop with a Sport Pilot license though, he's going to get a Private Pilot's license, so he can fly the 4-seat aircraft. He is now taking lessons with Jason Fuller at Boonville, and has about 16 flying hours under his belt.

When he returned to the Evansville area last year, he checked the EAA website to find out where the local chapter might be, and very quickly became a member of Chapter 21.

Hugh is in the agricultural support business, so he knows the ins and outs of an accounting ledger. When Larry Helming called and asked him to help out Chapter 21 as our Treasurer, he accepted the job. Thanks, Hugh, and welcome to Chapter 21!



Sebring: Light Sport Aircraft Industry Growing

I visited the Sport Aviation (LSA) Expo in Sebring Florida again this year. The LSA expo is quite a bit different than the Sun 'N Fun and AirVenture events we attend every year. The LSA expo is more like a light aircraft equivalent of an auto show, where all the manufacturers are there to show off their newest vehicles, all of them for sale. The LSA grounds at the Sebring airport are fairly compact, and one could get a pretty good idea of everything that's there in one day. There were about 70 aircraft on display. It struck

me as I was looking at all the aircraft on display that, when I learned to fly in the early '70s, the only two-seat aircraft you could buy brand new and ready to fly was the Cessna 150, and maybe the AA-1 Yankee. *Never in my life* until now has there been *so many* two-seat, ready to fly aircraft in production and for sale. Although I probably won't be buying any of these new aircraft, I'm really happy to see them there, waiting for those who will be buying them. I hope they are all successful.

The most successful of the Light Sport manufacturers is Flight Designs, and they have a new model: the MC. This is a metal version of the CTLS, and so is a bit less expensive. This aircraft will be the first prize for the AirVenture sweepstakes this summer.



This aircraft, called the Quasar, is from Brazil. It is a two-seat aircraft powered by an HKS-700E two cylinder engine. It can go 100 MPH on 2 GPH.

The Gobosh 800 (Go-Big-Or-Stay-Home) looks like a light-sport version of a Lancair.



The Paradise P-1 is also from Brazil. It was the most "Cessna 150" like plane there. It has control yokes rather than joysticks, and can be outfitted with hand controls for paraplegics.

Jim Schmitt liked the Dynamic Sport Cruiser. It looks like an LSA version of his Pulsar.



Magnetos—What are they, and how do they work?

We'll be having a program on Magnetos at our Chapter meeting on February 25. Here is some basic information from Wikipedia on magnetos, just what magnetos are, and how they work.

Description

A magneto is a device used in the ignition system of gasoline-powered internal combustion engines to provide pulses of high voltage electrical power to the spark plugs. Once found in every gasoline-powered automobile, it is now confined mainly to lawnmowers, chainsaws, and internal-combustion aviation engines. Magnetos and coils used in early internal-combustion engines generally used the term "tension" in lieu of the more modern term "voltage."

The first person to develop the idea of a high-tension magneto was Andre Boudeville, but his design omitted a condenser (capacitor); Frederick Simms in partnership with Robert Bosch were the first to develop a practicable high-tension magneto

The magneto was introduced on the 1899 Daimler Phönix. This was followed by Benz, Mors, Turcat-Mery, and Nesseldorf, and soon was used on most cars up until about 1918 in both low voltage (voltage for secondary coils to fire the spark plugs) and high voltage magnetos (to fire the spark plug directly, similar to coil ignitions, introduced by Bosch in 1903).

Operation

In the type known as a shuttle magneto, the engine rotates a coil of wire between the poles of a magnet. In the inductor magneto, the magnet is rotated and the coil remains stationary.

On each revolution, a cam opens the contact breaker one or more times, interrupting the current, which causes the electromagnetic field in the primary coil to collapse. As the field collapses there is a voltage induced (as described by Faraday's Law) across the primary coil. As the points open, point spacing is such that the voltage across the primary coil will arc across the points. A capacitor is placed across the points to suppress the arc, set the amount of voltage across the primary coil, and to control the rate at which the electrical energy dissipates in the primary coil.

A second coil, with many more turns than the primary, is wound on the same iron core to form an electrical transformer. The ratio of turns in the secondary winding to the number of turns in the primary winding, is called the turns ratio. Voltage across the primary coil results in a proportional voltage being induced across the secondary winding of the coil. The turns ratio between the primary and secondary coil is selected so that the voltage across the secondary reaches a very high value, enough to arc across the gap of the spark plug.

Aviation

Because it requires no battery or other source of energy, the magneto is a compact and reliable self-contained ignition system which is why it is still in use in many general aviation applications.

Magneto-equipped aircraft engines are typically dual-plugged, that is, each cylinder has two spark plugs, with each plug having its own separate magneto system. This arrangement provides redundancy in the event of a failure of one of the magnetos. Two sparks provide two flame fronts within the cylinder. The two flame fronts

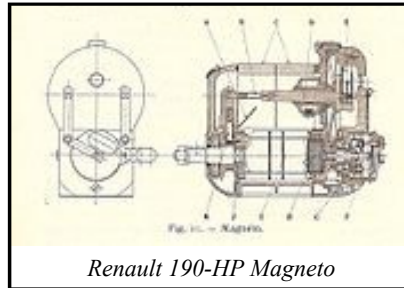
decrease the time needed for the complete fuel charge to start burning and therefore most of the fuel is already burning at a lower temperature and pressure. As the combustion pressure rises within a single plug cylinder, lower octane portions of the fuel mixture far from the original flame front can explode lighting off another flame front in a different part of the cylinder at a different time. This leads to engine knock. Therefore two flame fronts can help to decrease the octane requirement for any given engine and situation. This was very important given the very large bore size of most aircraft engines developed around World War II.

Some aviation engines as well as some older luxury cars have had dual-plugged systems with one set of plugs fired by a magneto, and the other set wired to a coil, dynamo, and battery circuit. This was done to improve engine efficiency without sacrificing reliability. Magnetos were once considered a more reliable ignition source,

but have the disadvantage of having fixed timing. This means that the timing must be a compromise setting which is neither the best for low RPM nor the best for high RPM. On the other hand, battery ignition systems have almost always had a timing advance system which can set the timing to the best setting for the speed the engine is turning, improving power output and fuel efficiency. As the reliability of battery ignition systems improved, the magneto fell out of favor for automotive use.

Modern engines have much smaller combustion chambers and less opportunity for knock given their modern combustion chamber design which attempts to eliminate "hot" areas of the cylinder. These modern chambers decrease octane demand by their engineered shape and swirl/tumble of incoming charge. Therefore, they no longer require double plugs to decrease octane demand. Harley Davidson motorcycle engines, being single-pin, air-cooled, and having a large "antique" combustion chamber design, can still benefit from double plugging. The same holds true for most drag racing engines where the volume and type of fuel (nitromethane) and engine design (mostly based on the 1960s Chrysler Hemi engine) requires additional flame centers in order to use the massive amount of fuel injected during the intake cycle.

From Wikipedia



Renault 190-HP Magneto



Slick Aircraft Magneto

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Upcoming Chapter 21 Events

EAA21 Chapter Meeting: Saturday February 25, 10:00 AM, Skylane Airport
No Meeting On February 11

The next Chapter meeting will feature a presentation on complying with Service Bulletins for Slick Magnets.
Bobby Hester will be guest presenter.

