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# EAA Chapter 569 Newsletter

Lincoln, NE

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## Meeting Announcement

**Date**: Tuesday, April 2nd

**Time**: 7:30pm

**Program:** Flight Testing Your Homebuilt

Harold Bickford will give a presentation on phase 1 flight testing using the EAA Flight Test Manual and test card program. Much goes into the process of flight test and the test cards help to streamline the effort. The approach can actually be used for any aircraft to verify performance so there is wide applicability for the program.

**Place**: Duncan Aviation Engine Shop
5000 NW 44th St – Lincoln, NE

**President's Message**
**Harold Bickford**

Our fly-in was well attended as weather was finally favorable for some good flying. As always, many thanks for our crew who make this event so successful. Every third Saturday at Crete airport; people know and they come.

The recent flooding has brought much damage to Nebraska and really impacted many communities. One part of relief operations has been through the efforts of fliers throughout the area. Whether National Guard or civilian flights, supplies and people have been shuttled from staging areas to isolated places.

One of the many efforts was what has become known as the Fremont Airlift. In this case, Fremont became an island city for several days following the rise of flood waters which rendered roads impassable. The Fremont airport remained open and dozens of pilots flew their planes into and out of Fremont with people and needed supplies. This was a true grass roots effort done with individual initiative; neighbors responding as neighbors do even if they don't live next door. Members and friends of EAA 569 were among the number (which was well over 100 pilots and aircraft) including Mark Gaffney and Anne Schutte with Mark's Cessna, Larry Geiger with his Robinson helicopter and George Richmond with his Apache. Multiple sorties over the weekend of March 16-17 kept the effort going. Lincoln and Omaha airspace were very busy as these volunteers kept at it on their own dime and time.

Many thanks and heartfelt appreciation go out to these folks for an outstanding effort! This illustrates well one of the many ways general aviation can really benefit communities.

As weather becomes more conducive to flying, we will be coming out of winter hibernation. With that in mind if it has been a while since that last flight, do take a little extra time preflighting. That is for both the airplane and pilot. Refresher training can be beneficial and if a flight review is coming up now is a good time to look over the FARs, the Pilot Operating Handbook and get ready to fly the airplane through the maneuver sequence.

Looking ahead, EAA has designated May 18 as Learn to Fly Day. Additionally,

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they are encouraging chapters to have a Flying Start event. Since that is also our fly-in date this could be a really great opportunity to bring people out who are interested in flying but still have questions. Sometimes having that up close and personal experience is all that is needed. Who do you know who just might have some fun flying?

We look forward to seeing everyone at the April 2 meeting.

Harold Bickford,
Chapter President

## Book Review –

### *A History of Aircraft Piston Engines by Herschel Smith*

*By Dennis Crispin*

A friend was cleaning out the attic and came across a rather unusual book. Such things have a way of finding their way to me.

A History of Aircraft Piston Engines is a rather large volume first published in 1981. The third printing of the corrected paperback edition was in 1991 at the Sunflower University Press.

Herschel Smith, the author, states that he waited for years for someone to write this book, then decided to write it himself.

The book is well written and an easy read, especially for subject matter that is potentially a lot less than exciting. It is well illustrated with photos and detailed cutaway drawings. There are sketches to show engineering details. There is a wealth of information on the application of the many engines and the problems encountered in manufacture. Extensive tables detail the data on almost every piston aircraft engine ever built. It must have taken a great amount of time and effort to compile this information. It will be a great resource for anyone researching older aircraft. If you have any interest and/or knowledge of aircraft from the antique and classic eras, you will find this book quite fascinating.

The book points out that the successes of airframes and engines were intertwined. Great aircraft like the J3 Cub and the DC-3 were only possible because their designs coincided with the development of compatible engines. Conversely there were some potentially good aircraft and some fine engines that were not successful because their timing was wrong and the right motor or airframe was not, at the time, available. Lindbergh's Atlantic flight came about only because of the then new Whirlwind engine – the only engine with the reliability needed for extended hours of operation.

In the early days of aviation, American technology lagged far behind that of Europe. Going into WW-1, the US had only two engines suitable for extended production. Both were already a bit behind the development curve. The OX-5 was a water-cooled V-8 that powered the famous "Jenny" trainer. The engine was so primitive that you had to lube the rocker arms with an oil can during preflight. The larger "Liberty" engine was intended to be built in inline 4- & 6-cylinder versions as well as V-8 and V-12 layouts. The 4 and 6 never made it beyond the development stage and the V-8 was discontinued after a short production run. Many thousands of the V-12 engines were built by Packard, Ford and Lincoln with just a few manufactured by General Motors. The Liberty engine had the best power to weight ratio of its time.

After WW-1 the development of new powerplants was hampered by the vast number of OX-5 and Liberty engines available on the surplus market. However, the presence of cheap engines inspired the creation of many new airframe designs.

WW-1 in Europe saw the development of many different types of aero engines. The most interesting ones were the rotaries, a radial design, usually five cylinders, where the crankshaft was bolted firmly to the firewall and the entire engine spun around with the prop attached. The rotaries were comparatively light and powerful but had some distinct problems. The spinning mass of the engine created gyroscopic forces that made the plane difficult to turn in one direction. The motors were lubricated with castor oil which had an unfortunate laxative effect on the pilot who sat breathing the oil spray and fumes that came off the engine. The engines were difficult to start and were primed to a flooded condition. Often the engine belched out a bunch of burning fuel onto the ground under the prop. Whereupon the ground crew would simply pull the plane back and let the fire burn itself out. There was no way to

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throttle the rotary, so it ran at full power all the time. There was a "blip switch" in the cockpit which would momentarily short out the ignition to reduce power for landing. The unburnt fuel would then ignite in the exhaust stacks. Landings must have been exciting with a ring of fire encircling the engine. The hazards of flying these airplanes were far more than just the risks of combat.

In the years between WW-1 and WW-2, the piston aero engine underwent a great development. Many of the refinements, like turbocharging and fuel injection would not find their way onto automobile engines for another fifty years.

Inline aircraft engines were built in 2, 4, 6 & 8-cylinder editions with V-8, V-12 & V-16 variants. The fine radial engines came as 3, 5, 7 & 9-cylinder models then expanded into "two bank" layouts of 10, 14 or 18 cylinders. A few were of "one piece" construction, but most used individual cylinders. One manufacturer built 4, 6, V-8 & V-12 inline and 5,7& 9 radials all using the same cylinder assembly. All the different formats were tried in both water-cooled and air-cooled variants. Several successful designs, needing speed reduction, drove the output from the camshaft instead of the crankshaft.

The small production numbers of aircraft engines allowed the builders to try some rather exotic engineering. Several designs used sleeve valves, which allowed the engine to produce more power and have greater fuel efficiency than that afforded by the common poppet valves. A few tried eliminating the crankshaft by using a barrel cam or wobble plate to transfer the linier motion of the pistons to the rotation of the output shaft. The opposed piston engine, with 6 cylinders, 12 pistons and two crankshafts found several successful applications.

Of course, there were many more failures than successes in the world of aero engine development. In a few cases an engine was put into production just to become an "orphan" when the aircraft it was intended for was canceled. An example of this is the inverted, air cooled, V-12 Ranger which disappeared into the surplus market and no one ever found a good use for it.

Packard developed a fine V-12 liquid cooled aero engine but found no one to buy it. It was modified for marine use and used, in pairs, to power the PT boats.

The diesel engine had some success in aircraft use. In Germany, several large transports used diesel power where the added weight of the engine was more than offset by the lesser weight of the fuel needed for long flights. When faster aircraft like the DC-3 came along the diesel went out of style because it didn't have the excess power needed for

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**This beautifully preserved Curtiss OX-5 is in the collection of the Kansas Aviation Museum in Wichita, KS.**

**Type: 8-cylinder water-cooled 90-degree Vee piston engine**
**National origin: United States**
**Manufacturer: Curtiss Aeroplane and Motor Company**

**First run: 1915**
**Number built: 12,600**
**Bore: 4.0 inch**
**Stroke: 5.0 inch**
**Displacement: 503 cu.in.**
**Dry weight: 390 lb.**
**Power output: 90 hp. At 1,400 rpm**
**Fuel consumption: 8 gal./hr. At 75% power**
**Oil consumption: 0.5 gal./hr. at 75% power**
**Power to weight ratio: 0.27 hp/lb**

takeoff with the higher wing loading. The last of the great Zeppelin airships used large, slow turning diesel engines.

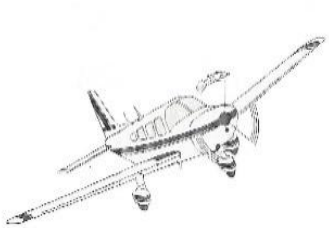
The frontispiece of the book is a detailed cutaway drawing of The Napier Nomad engine. It is a geared, 12 cylinder, horizontally opposed, valveless, 2-cycle, turbocharged, turbocompound, diesel. Try wrapping your mind around all that. The engine was claimed to produce 1,952 shaft horsepower

By WW-2 most manufacturers had standardized on 5, 7, 9, 14 & 18-cylinder radials with just a few liquid cooled V-12 & V-16 types. It is an interesting note that most of the aero engines used by Germany, Japan, and Russia in WW-2 were copies or developments of designs licensed or stolen from U.S. or British manufacturers.

Many American design engines were licensed for manufacture in England, France, Italy, Spain, Germany Japan and such unlikely places as Poland, Czechoslovakia and Pakistan. Many of the off-shore efforts were hampered with the inability to control the quality of the product and the lack of appropriate materials. Several European designs found a production home in the U.S. The most well-known was the Packard Motor Company building the Rolls-Royce Merlin. Most of the Merlin engines for the British Lancaster bomber, as well as those for the famous U.S. P-51 Mustang fighter, were built at Packard.

During WW-2 the government commissioned Allison, Pratt & Whitney, Chrysler and Studebaker to develop some extremely large engines. None of them were ever put into production because no one ever built an air frame suitable for such big piston powerplants. Allison produced a prototype 32 cylinder "W" engine that was basically two V-16s joined at the crankcase. Pratt & Whitney developed a 36 cylinder 4 row radial "corncob" engine that produced 5,000 horsepower in test. Development stopped before the engine was taken to the projected 7,000 horsepower. One example of this engine still exists, in a crate, at the Smithsonian's Beacon Hill facility. The biggest engine was to be the one designed by Studebaker. The project was canceled while still on the drawing board when research showed that the cylinders were too big for effective flame propagation. After WW-2 the big radial engines had a brief heyday in the first ocean hopping airliners like the DC-6 & 7, Constellation and Stratocruiser and military applications like the B-36, B-50 and KC-97. Then, the large piston powerplant disappeared into the dustbin of history as the turbine came onto the scene.

Light aircraft engines became standardized on air cooled, horizontally opposed, 4 & 6-cylinder designs and have been unchanged in basic design (but with considerable refinement) for 75 years.



**News from** PIONEER AIRPORT ELEV. 805 ft

**EAA Headquarters**

## GA Pilots Assist Nebraska Town Cut Off by Flood Waters

*By Ti Windisch*

*EAA Assistant Editor*

Collin Caneva was doing a typical sight-seeing flight out of Lincoln, Nebraska, in his 1960 Cessna 182-B when he heard that his wife's aunt was stuck in Fremont, Nebraska. As Collin soon learned, she was far from the only one.

Fremont, a town of roughly 26,000, found itself entirely surrounded by flood waters after a dam burst in Spencer, Nebraska, due to meltwater and ice chunks contained within it. A Facebook post from his wife's aunt led to more and more people messaging Collin, and he said he wasn't the only one.

"There was nothing [officially] put out, just a bunch of pilots started showing up to Millard Airport, south of Omaha, and started offering rides back and forth from Fremont," Collin said. "Then came [the question] how do we get supplies out there. The only dry place was the airport. A couple of the FBOs around the airport opened their doors to be drop-off points."

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Silverhawk Aviation in Lincoln, Oracle Aviation in Omaha, and Fremont Aviation in Fremont were some of the main FBOs involved, with roughly 30 pilots flying hundreds of people in and out of Fremont.

"This was really necessary," Collin said. "If not for the airplanes these people wouldn't have a way to get back and forth to their families."

Mark Gaffney, EAA 836501, was another pilot who dedicated his time to helping out. He first loaded his 1959 Cessna 172 with supplies and went with his family to drop them off, but soon got called in to do more.

"Sunday morning, I got a call from a buddy of mine that said get up there. So, I got up there, and I'd never seen anything like it," Mark said.

Mark first primarily flew between Lincoln and Fremont, but on Monday he started making trips from Millard Airport by Omaha to the stranded folks in Fremont. He took supplies and first responders into Fremont, and then brought stranded people out so they could reunite with families or simply get to safety.

"I've always marveled at pilots in general and people coming together to help each other out … it still blew me away," Mark said. "Everybody just jumped in their airplanes and went. I took the day off Monday, we did what we needed to do."

A lot of the people that Mark flew back or forth had never been in a GA aircraft before, but any trepidation they may have had wasn't enough for them to pass on the opportunity to do what they had to do in a time of such crisis.

"It was emotional, just to see it," Mark said. "The terminal, the people there were desperate. I flew a lot of people who had never flown on an airplane before, and I don't think I flew anybody who had flown on a small airplane. When the Titanic is sinking, you get on any boat you see, you don't care."

Collin ended up organizing some pilots through social media, including some who offered to come from neighboring states, and he said that selflessness was a silver lining of this dire circumstance in his opinion.

"I think the coolest story isn't about an individual or anything, it's about the pilot community as a whole," Collin said. "Talk about a group of people that's selfless, that's pretty cool. They drop everything, take off work, and say hey here's my plane."

By early this week, the water had subsided enough for crews to make some roads usable. The supplies that were being carried by aircraft such as Cessnas, Pipers, and RVs were able to be loaded into a semi and driven into town. Thankfully, Fremont was no longer waterlocked.

The help from pilots in the area ensured that those who were stranded there had some supplies, and anyone who needed to get out was able to. Collin said the event was a poignant reminder that people are all on the same team.

"All you ever hear about is how our country is divided," Collin said. "Something like this happens and all of a sudden there's no division."

Mark assisted when a devastating tornado hit Oklahoma several years ago, and said he felt the flooding was harder to deal with because of the isolation involved.

"It was devastating to see that," Mark said of the tornado damage. "But this was worse because you're cut off. In Oklahoma, they were bringing in semis. This was just GA, that's all they had."

Luckily, that proved to be enough for the folks in Fremont, Nebraska.

*(Kudos to all the area pilots who helped out with Fremont Airlift. – Ed.)*

## White House Budget Includes $3 Billion for ATC Modernization and No Privatization

The White House 2020 fiscal year budget contains no call for air traffic privatization or any separation of ATC from the rest of the FAA, a clear sign that the united opposition from EAA and more than 250 other general aviation industry groups has been heard.

Last year, Congress considered a proposal to separate the air traffic system from the rest of the FAA and instead place it in the hands of a private board dominated by airlines and their interests, a proposal that at the time was backed by the White House. Unified opposition from general aviation, state aviation

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officials, labor groups, and bipartisan members in Congress stalled the proposal. EAA has consistently called for modernization, not privatization of the nation's air traffic system and the proposed budget allocates $3.3 billion for the modernization of ATC and other FAA infrastructure.

"EAA has consistently and strongly advocated against privatization of the national airspace system, and the proposed budget supports our priority that air traffic technology should be steadily modernized and new facilities built to improve the capacity and safety of what is already the most complex and successful system in the world," Sean Elliott, EAA vice president of advocacy and safety, said. "This is a win for EAA and for general aviation as a whole."

The White House budget establishes the administration's priorities for the upcoming fiscal year but ultimately it is Congress that determines how much money is actually appropriated for the FAA and how it will be spent. EAA will continue to advocate for modernization of the air traffic system and for the sanctity of manned flight safety and airspace access as emerging technologies such as UAS and autonomous flight vehicles seek to share resources in the air traffic and airspace system.

**Minutes of the Club Meeting**

President Harold Bickford brought the meeting to order at 7:30 PM on March 5, 2019

Guest speaker was Jacob Smith, unmanned aerial systems (UAS) flight director for UNL Extension, filling in for Wayne Woldt. On static display were fixed wing and rotary wing craft that are in daily use for teaching and research.

Both aircraft have sophisticated gimbal mounted GPS tagged multi band camera systems capable of producing ortho-rectified imagery for agriculture and natural resource projects. UNL offers summer extension classes to teach operation of UAS systems and mapping data processing.

The JDI rotor-wing model has eclipsed the older fixed wing in most use. It is easier to maneuver and requires less space to land. The commercial grade device is capable of imaging 160 acres in 20 minutes, producing several gigabytes of data.

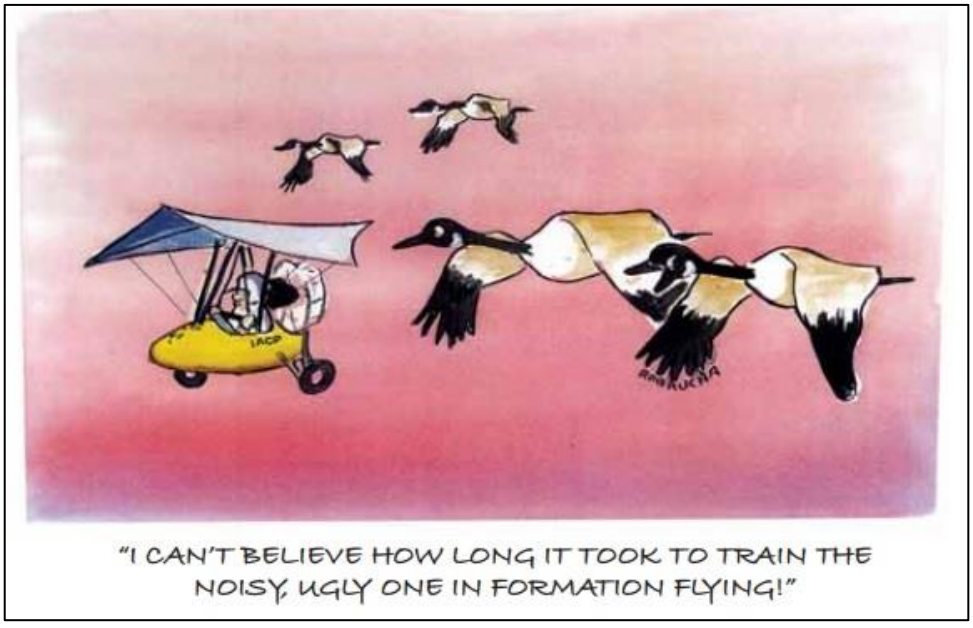
Keal Bockelman, treasurer, read a letter of appreciation from the Nebraska DOT/Division of Aeronautics for our contribution to the Aviation Art Contest.

There being no other business, the meeting was adjourned at 08:55 PM.

Jerry Mulliken, Secretary

**Wallace Peterson Scholarship**

Provides a $500 scholarship for use toward flight training or to attend an EAA Air Academy session. Established in memory of Wallace Peterson, an aviation enthusiast who fell in love with airplanes while watching them take off from a dirt strip near his home in Omaha, Nebraska, this scholarship will help put another young person on the path to a lifetime love of flying. Special considerations extended to applicants from Nebraska, though applicants from any state will be considered. Contact EAA for more information.



**Builder's Report**
*By Bruce Holtmeier*

*(I asked some of our members for a status report on their projects. Here is one from Bruce who is building an RV-10. – Ed.)*

I have been busy working on the empennage kit for a Van's RV-10.

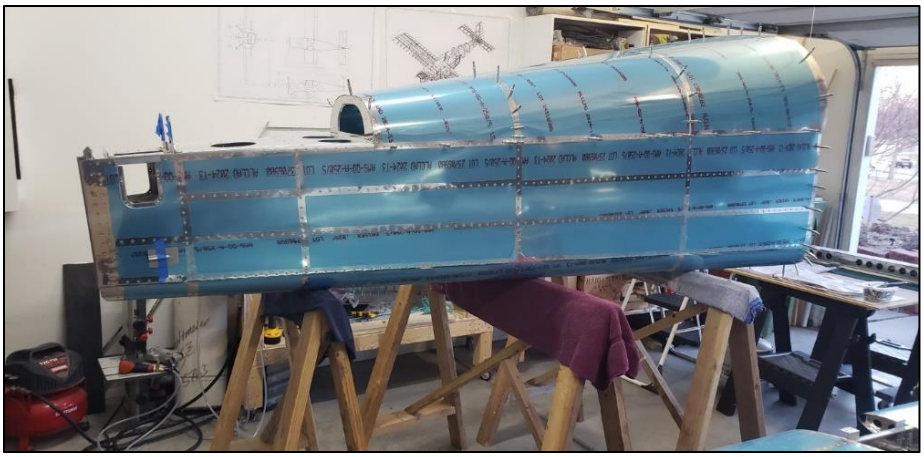
The empennage kit consist of the vertical stabilizer, rudder, horizontal stabilizer, elevator and trim tabs and the tailcone section. I have the tailcone mostly completed.

I am holding off on permanently attaching the top section until I have made a decision on what accessories need to be placed in the tailcone so I don't have to crawl inside a completed tailcone.

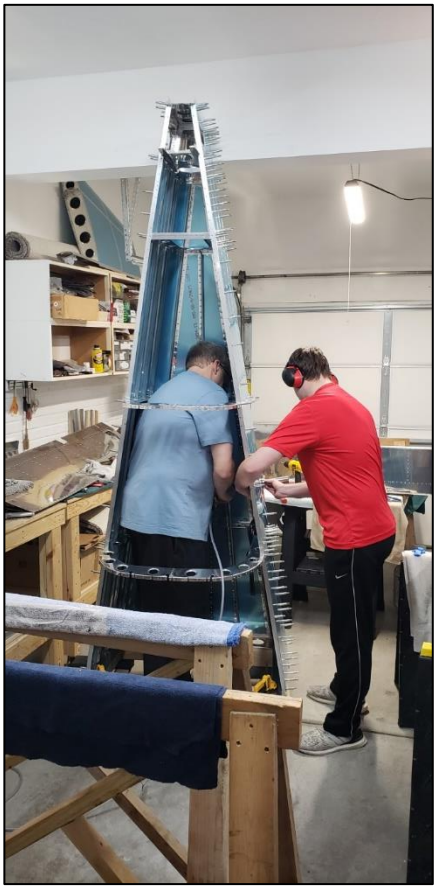
Up next is attaching all of the components together and adding the fiberglass tips.

After this kit comes the wing kit which is on order and should arrive the end of May.

How many rivets are in the empennage kit? The rivet counter is at approximately 6,000 and that is not counting the rivets that are drilled out and redone.



**The tail cone mostly complete.**



**Back riveting the tailcone with the help of my son Phillip.**

## For Sale

25% share in Beautiful RV-9A N678RA

- IFR equipped including ILS EFIS with synthetic vision and highway in the sky
- 2 axis autopilot, GPS and ILS coupled
- ADSB out and in equipped
- 6 GPH cruise at 150MPH
- LED position, strobe and landing lights

This airplane is ready to go anywhere, any time. $18,000
Contact Tom Henry @ 402-417-8558

Click on picture to enlarge

## For Sale

BRAKES

Matco 6" wheels and brakes.
Around 200 hours. $200

Contact: Dean Hoy
Home: 402-423-6109
Work: 402-489-7171

# Events

**York Airport (JYR),** EAA Chapter 1055 Fly-in breakfast on the 1st Saturday of every month. 0800 - 1000.

**Crete Airport (CEK),** EAA Chapter 569 Fly-in breakfast on the 3rd Saturday of every month. 0800 - 1000.

**Apr 2 - 7**, Sun 'n Fun, Lakeland, FL; http://www.sun-n-fun.org/

**Apr 3,** AOPA Peaks to Pavement Seminar (Applying Lessons from the Backcountry), Bellevue West High School 1501 Thurston Ave, Bellevue, NE 1900-2100; Click here for more info.

**Jun 1,** Nebraska State Fly-in, Gordon, NE (KGRN).

**Jun 22-23**, Midwest Aerobatic Championship, Seward, NE (KSWT); If you would like to volunteer, call or text Tom Trumble @ 402-540-6089.

**Jul 22 - 28**, AirVenture, Oshkosh, WI http://www.airventure.org/

## Accident Report

Accident occurred 03/05/2014, 1056 CST, Jackson, TN

Aircraft: Cessna 172R, Registration: N9417Z

Injuries: 2 None

The pilot reported that, during the climb after takeoff in instrument meteorological conditions, he noted that the engine was losing oil pressure rapidly. He immediately made a 180-degree turn to return to the departure airport. While inbound on the instrument landing system (ILS) approach, he realized that the airplane was too high, so he executed a 360-degree descending turn. He then again proceeded inbound on the ILS approach. He continued the descent but, because the airplane had not captured the glideslope, he executed a missed approach. He then circled the airplane around and re-established the airplane on the localizer. Subsequently, the engine lost all power, and the airplane began descending. The pilot subsequently landed the airplane on a road just north of the airport. During the landing, the right wing impacted a highway sign, which resulted in substantial damage to the right wing. The airplane then veered right and entered a cornfield.

Examination of the wreckage revealed the presence of oil on the back of the engine, firewall, and belly. The engine was started with the engine cowling removed, and oil was observed to appear on the back of the accessory pad near the lower vacuum pump. Further examination of the area revealed that the accessory drive adapter gasket was the source of the leak. Review of the airplane's maintenance records revealed that, on the day before the accident, the lower vacuum pump had been removed and that a new vacuum pump, shaft seal, and accessory drive adapter gasket had been installed. Examination revealed that the proper gasket was installed; however, it was distorted and showed signs of excessive compression and "squeezeout," which indicated that the nuts had been overtorqued during installation.

John Cox
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