

THE SEACOAST AIRFOIL

October 2018

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EAA 225 Meeting Tuesday, October 9, 2018

Newsletter for
members and
friends of EAA
Chapter 225.

1978 - 2018 ...

Next Gathering:

Tuesday, October 9, 2018

Place:

Skyhaven FBO Pilot's Lounge

Directions to the right >

Times:

Meet, Greet and Dinner at 6:00pm
with our VP John Ricciotti

Meeting to follow at 7pm

EAA Chapter 225

*Celebrating our 40th year of aviation
community in the seacoast region sharing
aircraft building, restorations, the skies
above us. and fellowship.*

October Events

- Oct 13: Limington, ME EAA 141 4th Annual Stick 'n Rudder Fly-In. Come join us from 8am to 2pm
- Oct 20: Sanford, ME EAA 225/1210 Fall Young Eagle Flight Rally, at Southern Maine Aviation Pilot's Lounge for kids age 8-17 free flights.
- Oct. 27: Knox County Flying Club breakfast from 8-10am. Owls Head, ME. Last Breakfast of the season at the club house. Jeremy at highergroundaviation@gmail.com



How A Constant Speed Propeller Works

By Colin Cutler

What's that blue lever next to the throttle? It's the propeller control, and when you fly a plane with a constant speed propeller, it gives you the ability to select the prop and engine speed you want for any situation. But what's the benefit, and how does it all work? Constant speed propellers work by varying the pitch of the propeller blades. As the blade angle is increased, it produces more lift (thrust). At the same time, more torque is required to spin the prop, and the engine slows down. The opposite is true when the blade angle is decreased: the torque required is decreased, and the engine speeds up.

Why Is It Called Constant Speed?

First off, the propeller doesn't always operate at the same speed. It just means that you can select the RPM you want for a given situation.

Taking off? You'll want a high RPM for max takeoff power. Cruising? You can pull the RPM back by increasing the blade angle, making your engine more fuel efficient.

How Do You Move The Propeller? The propeller's blade pitch is changed hydraulically, using engine oil. That's right, the same oil that bounces through your cylinders, keeping them cool and lubed, is used to change the pitch of your propeller blades. We'll get into how the oil changes the blade angle in just a second. There's also a spring on the back of the propeller hub assembly that helps the propeller return to a low pitch/high RPM setting, which we'll also get to in a bit.

For most single-engine planes, there are stops installed so the blade can't move too much in either direction, and that's a good thing, because you could find yourself in real trouble if you completely flattened or feathered the prop on your single engine plane. The Governor (Not The One In Charge Of Your Home State)

The Governor (Not The One In Charge Of Your Home State)

By now, you understand that there's a blue prop lever in the cockpit that lets you adjust the prop pitch and engine speed, but there's a little more magic under the hood that makes it all happen.

The component in charge of it all is called the governor. The governor moves oil back and forth through the propeller hub to make sure the prop is at the pitch and speed that you want.

There are several parts to the governor that make everything happen. Let's take a look at what they all do: Governor Control Lever

(Story continued on Page 3)

EAA 225 Skyhaven Young Eagle Rally

Saturday, October 6, at Skyhaven Airport was our last NH Young Eagle Rally for 2018. It was a good day! Lots of thanks goes out to our EAA Pilots: Andy Travnicek (Maule M7), James Barnhard (Cessna 172) and John Ricciotti (T-Craft) who flew 13 kids on Saturday. Many thanks to President Todd Scruton and his daughter Emma for helping with the cooking, along with John & Pupae Ricciotti, and Bill Johns who also spent time on the grille. Thanks to EAA 1210 President Steve Welch for handling the dispatch of kids to our pilots and to Gerry Hanscom who helped him. Thank you to Dick & Patsy Jackson and Norm Charron who supported the event. Also to James Barnhard's son who helped for a while and for keeping us all on our toes.

We were blessed with a just right fall weather day, not too warm and not too cool.

(Constant Speed Prop, continued)

The governor control lever is attached to the blue prop control lever in the cockpit through cables or linkages. When you move the prop lever forward or back, the control lever moves as well.

Threaded shaft

The threaded shaft is connected to the governor control lever. It looks pretty much like a bolt, and it works the same way. When you turn it left, it moves up, and when you turn it right, it moves down. (righty tighty, lefty loosy!)

Speeder spring

The speeder spring sits between the threaded shaft and the flyweights. When the threaded shaft moves down, the spring gets squeezed (its tension increases), and it forces itself down on the flyweights, causing them to 'fall' inward. When the threaded shaft moves up, the opposite happens.

Flyweights

The "L" shaped flyweights, which spin around in a circle, are connected to the engine through gears. They're also connected to the pilot valve, which they move up and down. When the engine speeds up, the weights spin faster and fly out due to centrifugal force, lifting the pilot valve up. When the engine slows down, the weights fall in from pressure from the speeder spring, lowering the pilot valve.

Pilot Valve

The pilot valve, which we mentioned is connected to the flyweights, is moved up and down by the flyweights, allowing oil to flow into, or out of, the propeller hub. We'll get to exactly how that happens in just a second.

Governor Gear Pump

The last major part of the governor is the gear pump. The pump boosts oil pressure before it heads out of the governor and into the propeller hub. With the boosted pressure, you get better, quicker response from the propeller when you move the lever back and forth in the cockpit.

So How Do You Use A Constant Speed Prop On A Flight?

In most cases, you takeoff and land with the prop control full forward, which means your propeller is in the flat, low pitch/high RPM setting. Having your prop in that position gives you a lot of takeoff power. But once you get off the ground and closer to your cruise altitude, you want to start pulling the prop lever back. By pulling the prop lever back, you adjust to prop to take a bigger 'bite' of air. What's really happening is that you're increasing the angle-of-attack of the propeller, and in turn, increasing the torque required of the engine to swing the prop around.

With that increase in torque, the engine slows down, which in cruise flight is a good thing. It means your engine isn't spinning as fast, your fuel efficiency is increased, and the engine parts won't wear down as quickly. Think of it kind of like switching to a higher gear on your bike. You need to push a little harder with your legs, but you don't need to pedal nearly as fast.

Moving The Prop Lever Forward

When you're coming in to land, you typically move the prop lever full forward. By moving the lever forward, you give yourself more 'instantaneous' power, because the engine doesn't need to work as hard to turn the prop. That's something that's useful if you need to go-around.

What Happens When You Start To Climb Or Descend?

Once you've set your engine RPM using the prop lever, the governor will do everything it can to maintain that RPM. But what happens when you start climbing and descending?

Underspeed

Let's look at a climb first. If you don't touch your engine controls, and you pitch the airplane up, your engine has to work harder, and it will start to slow down. This is a situation called

EAA Webinars Schedule

We've announced our (October-November) that you can enjoy from the comfort of your home. EAA Webinars are free to all aviation enthusiasts, but pre-registration is recommended since space is limited to the first 1,000 registrants.

Upcoming webinars include the following topics and presenters:

October

Turbocharging Systems

Wednesday, October 3 – 8 p.m. CDT

Presenter: Mike Busch

Qualifies for FAA Wings and AMT credit.

[Register Now >>](#)

EAA Flying Clubs – Growing Participation in Aviation

Wednesday, October 10 – 7 p.m. CDT

Presenter: David Leiting, Chapter Outreach Specialist

[Register Now >>](#)

Preparing for an IFR Winter Cross-Country

Wednesday, October 17 – 7 p.m. CDT

Presenter: Gary Baker

Qualifies for FAA Wings credit.

[Register Now >>](#)

How to Prepare for an Unknown Aerobatic Sequence

Tuesday, October 23 – 7 p.m. CDT

Presenter: Jim Bourke

[Register Now >>](#)

Flying to the Bahamas

Tuesday, October 30 – 7 p.m. CDT

Presenter: Mike Zidziunas

Qualifies for FAA Wings credit.

[Register Now >>](#)

November

Operating Oversquare

Wednesday, November 7 – 8 p.m. CST

Presenter: Mike Busch

Qualifies for FAA Wings and AMT credit.

[Register Now >>](#)

Charting Your Course: Deciphering the VFR Sectional Aeronautical Chart

Wednesday, November 14 – 7 p.m. CST

Presenter: Prof. H. Paul Shuch

Qualifies for FAA Wings credit.

[Register Now >>](#)

Tailwheel Flying Techniques

Wednesday, November 21 – 7 p.m. CST

Presenter: Glen Oliphant

Qualifies for FAA Wings credit.

[Register Now >>](#)

ADS-B: A Practical Guide For Pilots

Wednesday, November 28 – 7 p.m. CST

Presenter: John Zimmerman

Qualifies for FAA Wings credit.

[Register Now >>](#)

Don't forget to [Register today](#) for these upcoming free webinars!

Audio speakers and a broadband Internet connection are required to participate in the webinars. Visit the [webinars page](#) for more information about EAA's Webinars.

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underspeed. As soon as it happens, the flyweights will start to fall inward because they slow down as well. When that happens, the pilot valve moves down and oil flows out of the propeller hub, reducing the pitch of the blades. As soon as the blade pitch decreases, the engine is able to speed up again, and it resumes its normal set RPM.

Overspeed

When you pitch the airplane down, the governor takes over again. By pitching down and not touching the engine controls, the engine will start to speed up, and the flyweights will fly outward, due to centrifugal force. As soon as that happens, the pilot valve will raise, oil will flow into the prop hub, and the pitch of the blades will increase, slowing the engine to your set speed. What Happens If You Lose Your Engine Oil?

Most single-engine plane propellers are designed to 'fail forward', which means that if you run out of engine oil, the propeller will automatically move into the low pitch/high RPM setting.

It happens for two reasons: 1) the spring behind the prop hub piston forces the piston forward, and 2) the natural twisting moment of the blades moving through the air causes them to return to the low pitch/high RPM takeoff and landing setting.

All of that being said, if you run out of engine oil, you are going to have bigger problems than just a lack of prop control - chances are, your engine isn't going to run for much longer.

Putting It All Together

A constant speed propeller gives you the ability to select the engine and propeller speed you want for any situation. It also makes your plane more adaptable to different phases of flight. And last off, with an extra engine control in the cockpit, it makes you look like a genius to your passengers.

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