AUBURN AVIATION ASSOCIATION SINCE 1984

propwash

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Dedicated to aviation, safety, friendship, community involvement and education since 1984.

AUGUST 2006

Inside This Issue:

Remember, there is no August AAA meeting as we will be putting on *Thunder in the Sky 2006!*

Thunder in the Sky
Dinner Dance : August 11th
Air Fair : August 12th

www.thunderinthesky.org

President's Message

Don't forget, there is no regular meeting in August. The August 11th Air Fair dinner-dance is to be our substitute. The theme is a WWII Style U.S.O. party. Cost is just $25.00 per person and includes everything except the optional alcohol based libations. Tickets are available through our three satellite sales offices. See the ad elsewhere in this newsletter. Buy them early and bring some friends.

The July meeting was well attended, considering that it fell on the 5th of July. We had a very interesting presentation by Jim Doyle of Columbia (California) about the history of the Stearman trainer and his experiences retracing the military career of his 1941 plane. He toured all of the bases where his plane had served and interviewed a number of the veterans who had trained in it and then wrote a book about his tour and the wartime experiences of the trainees. It is a fascinating book and I highly recommend it. It is available through Amazon Books. Jim's Stearman was prominently displayed in front of our clubhouse during the meeting.

The next regular meeting will be the September meeting on September 6th. I'll see you there as well as at the Air Fair in the meantime.

'Evan A. Wolfe, President 2005-2006

Evan Wolfe
AAA President
2005-2006

OLD "INDIAN TRICKS" FOR PILOTS #8

By: Evan A. Wolfe, C.F.I.

The last installment of "Old Indian Tricks" dealt with a compilation of tricks to get better economy. This month's installment will continue in that vein by discussing the management of a constant speed prop to enhance economy and then some general tips for constant speed propeller use. There are several types of propellers. The fixed pitch propeller is generally a one piece propeller where there is a set blade angle that is not adjustable by the pilot. The constant speed propeller has moveable blades that have widely variable pitch angles. From a performance standpoint, the constant speed prop has many advantages, but is much more expensive and requires more maintenance.

The propeller on your airplane is roughly the equivalent to the entire drive train on your automobile. Instead of transferring the motive power from the engine to the road, as in your car, the propeller transfers the motive power from your aircraft engine to the sky (air). As you increase the power, the propeller speeds up, pushing the air rearward as it cuts through the air at an angle. As the air is forced rearward, the resultant force is that the airframe is pushed forward. If you sit in a little boat and push hard against another boat, your boat will react by moving away in the opposite direction of your push.

A fixed pitch prop does not change pitch, regardless of the power setting or speed of the plane. It of necessity has to be compromised between the best angle for initial acceleration and climb at low airspeeds and the best angle for your potential cruise speed at the optimum cruise r.p.m. for your engine. It would be like having an automatic transmission in your car with a fluid coupler clutch (which car automatic transmissions have) but with only one transmission drive ratio. If that one drive ratio is a low gear, your car will start out fast but the engine will be over-reving long before you reach a desired cruising speed. If it is too high, the cruise will be fine but initial acceleration and climb will be sluggish. The constant speed prop has widely variable pitch so it is like having a nearly infinite choice of gear drive ratios on your car so that you can select the optimum one for each vehicle speed and power setting. If your airplane engine has a rated power speed of 2700 r.p.m., you would want it to go to that speed at the start of your takeoff roll, and remain at that speed, regardless of your airspeed, so long as you were trying to extract maximum performance from your plane. Since 2700 is also your redline, or do not exceed speed, if you have a fixed pitch prop, you would have to compromise the pitch angle so that full throttle at the initiation of the takeoff roll would not exceed the 2300. As the aircraft takes off and builds speed, the air load on the prop decreases and the engine will speed up. The trick is to find the pitch angle that will give you 2700 r.p.m. at full power in level flight at the top speed of the plane. If your engine over revs at top speed, your pitch angle is too small. If it cannot achieve the rated power engine speed at the maximum airspeed, the angle is too high. The best selection of a fixed pitch prop, is at best, a compromise between the high airspeed and the low airspeed requirements.

A fixed pitch prop is basically rated by two elements, diameter and pitch angle. The diameter is simply the overall length of the prop. The pitch angle is the distance in inches that the propeller would force the plane forward in one full turn if there was no slippage in the air whatever. In reality, there is a lot of slippage, especially initially at low airspeeds. Think of the pitch angle rating as being somewhat like a screw going into a semi-solid substance. The higher the angle of the threads (coarser), the further the screw will penetrate the substance with each turn of rotation. Propellers have often been called "air screws" because they do literally screw through the air as the airspeed gets high enough for them to more efficiently transfer the power of the engine. A typical airplane such as a Cessna 170 uses 76"x54" fixed pitch prop. That means that it has a diameter of 76" and a pitch angle that would propel the plane forward 54" for each 360 degree rotation of the prop, if it had no slippage at all. A "climb" prop for a 170 would be a 76"x52" prop and a "cruise" prop would be a 76"x56" prop. The standard 76"x54" prop is a compromise between the climb and cruise requirements.

The faster the airplane travels through the air, the more efficient the propeller generally will become. A very sleek, low drag airplane, will go faster on a given amount of power and will achieve a much lower degree of slippage (higher propeller efficiency) at higher airframe speeds. A typical plane with a fixed pitch prop and an engine with 150 h.p. will only rev up to about 2300 r.p.m. at the start of the takeoff roll at full throttle. That means that the plane only has about 120 h.p. available because it cannot achieve its full power r.p.m.'s. A constant speed prop on the same engine would start out with a lower blade angle which would allow the full rated 2700 r.p.m. at the start of the takeoff roll and would therefore have about 30 additional h.p. for initial acceleration and climb. As the speed of the aircraft increases, the propeller governor senses any increase in propeller speed and automatically increases the blade pitch angle to maintain the rated 2700 r.p.m. that the governor is set for. The propeller control lever, or knob, controls the governor setting and the governor automatically adjusts the blade angles to maintain whatever speed it is set for, within the blade angle adjustment range. That is why it is called a "constant speed" propeller. It is more than just an adjustable pitch propeller. The governor will constantly change the pitch angle, within its adjustment range, to hold a constant r.p.m. that the pilot has set the propeller speed control for.

By the late thirties, automobile manufacturers began to offer overdrives for the transmissions of their cars. These allowed for more speed in cases where the top gear was too low, but mainly, they were for the purpose of increasing fuel economy at cruising speeds. As long as the car was not trying to accelerate, or climb a hill, it would shift into overdrive. The higher gear ratio of the overdrive would allow the car to go further on each rotation of the engine. Mileage could typically be increased by ten percent or more. A constant speed propeller can do the same thing for your airplane. If you select a lower r.p.m. on your propeller governor control for cruising, it is like shifting into overdrive in a car.

As a general rule, we have been taught as pilots not to exceed a ratio of one inch of manifold pressure per 100 r.p.m. This was for the purpose of not over-boosting or "lugging" the engine. If you step hard on the throttle of your car at a low r.p.m. in a higher gear, the engine may be inclined to pre-ignite or "ping". Pre-ignition can cause extreme forces on the pistons and rods and extreme and destructive heat. In operating your aircraft, the best economy in cruise will be achieved by operating at the lowest r.p.m. that the engine can be run at for a given manifold pressure, so long as you don't push it to the point of pre-ignition. You may make the same power at 22 inches and 2400 r.p.m. as you make at 24 inches and 2200 r.p.m. but you will get significantly better fuel economy at the lower engine speed and higher throttle setting. The propeller will have less drag at the lower rotational speed.

During descents, a lot of pilots simply reduce power by reducing the throttle manifold pressure and leaving the prop control set for cruise r.p.m.'s. If you will reduce the manifold pressure and the r.p.m. setting, you will burn less fuel. If you were cruising at 24 inches and 2300 r.p.m., a good descent setting might be 22 inches and 2000 r.p.m. The lower the power setting, the less likely it is that your engine would pre-ignite because the engine will be running cooler at the lower power and higher airspeed. The cooler the engine is running, the higher the ratio of manifold pressure to r.p.m. it will tolerate. Each engine and prop combo has its own unique requirements, but the foregoing will be applicable in principle. With a constant speed prop equipped aircraft, you have an "overdrive". Understand it and don't be afraid to use it to your advantage.

Look for more "Old Indian Tricks" in future issues.

Attention Antique Aircraft Owners

Attention all antique aircraft owners. Do you realize we are half way to fulfilling our responsibility for aircraft display. We will complete our requirements in August. We have selected the first and last week of August, specifically Aug 5,6,7 (Sat/Sun/Mon). Not forgetting the 12th which we can include for an extra day, and Aug 26, 27, and 28 (Sat, Sun, Mon). Our responsibility for displaying will have been completed. The hours are 10am to 2pm. A smile is important!

Any questions please call me:
Walt Pease (530) 823-0182

HIGHLIGHTS FROM THE JUNE 27, 2006 5AC COMMITTEE FOR THE JULY 2006

1. Bob Snyder gave a report on the status of the East End Project. The City is negotiating with the only bidder, Central Valley Engineering to get the bid within the funds available. He anticipates the contract will be awarded in mid July. Note: The Contract was awarded on July 10, 2006.

2. Airport Strategy Plan. A meeting was held with Wayne Manning on June 20 and the results emailed to all interested parties. Every effort should be made to get more input from the Airport users as only 6 people were at this meeting. This Airport is yours and this is your chance to decide it's future development.

3. There was no action taken on the Bill Clark Hanger issue.

4. Discussed request by the Placer County Sheriff's Office for a possible permanent Heliport.

5. There was a brief discussion on possible litigation on the Lily Lease.

Submitted by: Don Anderson, 5AC Representative.

THUNDER IN THE SKY 2006

Dinner-Dance is Friday, August 11th and the show is Saturday, August 12th.

A tribute to heroes of the sky, past, present and future. Warbirds, antiques, classics, unique home-builts, and classic and antique cars. Entertainment and education for the whole family. **Admission is $5.00 per person**. Children under ten years of age, accompanied by an adult, are free. The theme for the **dinner-dance is WWII U.S.O. Cost is just $25.00 per person. Dinner-Dance Tickets are available at the following locations:**

Law Office of Evan A. Wolfe, 12120 Herdal Drive, Auburn (near the Maidu Market), 885-4700

Warehouse Paints, 200 Palm Avenue, Auburn (corner of Palm and H-49), 885-7914

Auburn Harley-Davidson, Locksley Lane near H-49, 885-7161

Name That Plane!

Do you know what plane this is? Make your best guess and look for the answer in next month's *Propwash*!

Last Month's Aircraft

The Rutan Quickie 2

Auburn Aviation Association

Officers 2006

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No August Meeting

Instead join us for ***Thunder in the Sky 2006***
at the Auburn Airport

Dinner Dance : Friday August 11th
Tickets are $25 per person

Air Fair : Saturday August 12th
Tickets are $5 per person, children under 10 are free when accompanied by an adult

Visit www.thunderinthesky.org for more information