Complex Aircraft

AIR ECHO ALPHA 51, LLC.

Objective: To help gain familiarity with the characteristics of a complex aircraft.

Common Errors

- ❑ **Failure to increase RPM before applying max power (MP)**
- ❑ **Failure to decrease MP before reducing RPM**
- ❑ **Improper instrument interpretation**
- ❑ **Improper control vs. instrument correlation**
- ❑ **Failure to use proper checklist**
- ❑ **Improper adjustment of controls**
- ❑ **Improper power settings for flight profile**
- ❑ **Failure to establish the appropriate aircraft configuration at the proper time and sequence**
- ❑ **Fixation, omission errors**

Preparation & Preflight Discussion

❑ A Complex Aircraft is defined as an airplane having retractable landing gear, flaps, and a controllable pitch propeller

❑ FAR 61.31 states that no person may act as PIC of a complex airplane unless that person has received & logged ground & flight training from an authorized instructor in a complex airplane or simulator & has been found proficient in the operation and systems of the plane. Additional, a one-time endorsement must be recorded in the pilot's logbook certifying the person is proficient to operate a complex airplane

Constant-Speed Propeller

❑ Constant-speed propellers permit the pilot to obtain the optimum combination of engine RPM and manifold pressure that will result in the best performance for a particular flight condition.

❑ Controllable pitch propellers allow the blade pitch or angle to be changed while the engine is operating. This attribute enables a high percentage of the engine's power to be converted into thrust over a wide range of RPM and airspeed combinations. Additionally, once a particular engine RPM is selected, the propeller governor will automatically adjust the propeller blade angle to maintain that RPM.

❑ The governor controls the flow of engine oil to manipulate the propeller blade angle. Oil pressure from the governor helps to twist the blades toward high pitch, low RPM. When oil pressure is relieved, centrifugal forces assisted by internal springs, twist the blades towards low pitch, high RPM.

Constant-Speed Propeller Operation

❑ Controls
- Engine power is controlled by the throttle and indicated on the manifold pressure gauge
- Propeller blade angle is controlled by the blue control knob, labeled PROP RPM, and indicated on the tachometer. When the knob is pushed in, the propeller blade angle will decrease achieving a higher RPM and when pulled out, the blade angle will increase, decreasing RPM.

❑ Application
- To prevent undue stress on the engine, apply power by increasing the engine's RPM before increasing the manifold pressure. When reducing engine power, decrease the manifold pressure before decreasing the RPM. Additionally, avoid rapid throttle movements when making power adjustments. With less than 10" of MP, avoid continuous operations between 1750-2050 RPM.
- To develop maximum power for take-off the propeller control and the throttle should be positioned full forward
- To help establish the airplane in a climb after takeoff, the throttle and propeller controls should be retarded in order to achieve economical fuel consumption.
- When leveling the aircraft at a particular altitude, the throttle and propeller controls can be further reduced to decrease fuel consumption and increase thrust
- Before landing the propeller control knob should be positioned full forward in case a go-around is executed

❑ POH
- Cruise performance characteristics, range & endurance