



RV-7A Transition Training Syllabus (constant speed prop)

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Aircraft Preflight and Familiarization

1. RV general characteristics – high performance, clean, control sensitivity.
2. Engine and fuel system (injection/carb), 42 gal fuel, fuel management, boost pump.
3. Constant speed prop.
 - a. Ground ops: high rpm
 - b. Takeoff: high rpm
 - c. Climb: full throttle - rpm to 2600
 - d. Cruise: reduce MP to cruise power (22" to 24" and 2400 rpm)
 - e. Descent: reduce MP as appropriate, leave RPM as is
 - f. On final: Prop high RPM
 - g. There may be a prohibited region from 2000-2300 rpm on some 180 hp and Hartzell C/S prop combinations.
4. Tri-gear considerations
 - a. Design limitations, strength, rough field issues
 - b. Nose wheel steering techniques – use of brakes
 - c. Shimmy discussion
 - d. Takeoff: use of elevator
 - e. Landing: elevator control techniques. Nose wheel cautions.
5. Weight and balance
 - a. Gross weight consideration
 - b. CG and its effect on flight characteristics
6. Preflight inspection – exterior
7. Cockpit familiarization, layout, and configuration
8. Use of avionics
9. Emergency equipment, egress procedures
10. Checklist discipline
11. Starting procedures (fuel injection)
 - a. Cold:
 - i. Boost pump on, mixture rich, throttle advance, then cracked.. start
 - b. Hot:
 - i. Boost pump off, mixture lean, throttle cracked, start, richen slowly as engine fires
12. Taxi technique
13. Preflight check and run up

Takeoff and Climb (normal)

1. Just prior to takeoff, recheck these critical items from memory (**Takeoff Check**):
 - a. Controls
 - b. Trim
 - c. Fuel selector and fuel pressure.
 - d. Canopy locked
 - e. Note sight picture out front for future reference during landing
2. Emphasis of fuel pump and fuel management. Be aware of fuel pressure.
3. Rapid acceleration, P factor, right rudder. NOTE: There is a considerable amount of gyroscopic precession and P factor with the RVs equipped with a constant speed prop. Be aware of the need for right rudder, which is amplified with any changes in pitch. Especially noticeably at liftoff and slow speeds.
4. Do not drag the brakes. However you may have to lead with slight braking as you initially accelerate to maintain nose wheel steering. Your heels should be on the floor by the time the airplane is passing through 20 or 30 knots and you are steering with the balls of your feet. To apply brakes, it is a conscious effort to raise your feet and point your toes. This "foot attitude" is also very important in landing.
5. Use of prop. Cruise climb about 110 Kts (125 mph)
6. Climb power setting: full throttle and 2600 rpm
7. Clear the area.

Four fundamentals (straight and level, turns, climbs, descents)

1. Straight and level flight. Training power setting: 17" and 2400 rpm.
2. Basic turns and coordination exercises
3. 45 degree banked turns
4. Climbs: RPM first, then MP: 25" and 2500 rpm
5. Descents: reduce MP, leave RPM alone – Best glide speed 80 knots
6. Emphasis: Altitude control (plus/minus 100'), speed control,

Cruise Management

1. Fuel management. I fly ½ hour on the right tank, then 1 hour on the left tank, then back to the right. Use tack time and don't rely on fuel gauges. Turn the boost pump on when switching tanks and watch the fuel pressure gauge.
2. Leaning: Lean the engine below 75% power. At cruise, lean to peak EGT or approximately 25 degrees lean of peak. You should be able to expect a conservative 9 gph for flight planning purposes. Later... do your own calculations to know your airplane.
3. **Manage the fuel** (did I say that before??)

Flight at critically low airspeeds

1. Slow and do above maneuvers at 90 knots, then 60 knots. Maintain altitude and speed tolerances.
2. Examine stall buffet. Be able to maintain 5 knots above stall buffet. Examine maneuverability.
3. Note: **RVs do not have a lot of inherent stall warning**
4. Review turns, climbs, descents at minimum controllable airspeed.

NOTE: RVs are very pitch sensitive. BE VERY AWARE of maneuvering speed. DO NOT impose high elevator inputs at speeds above V_a (115 kts). RVs accelerate VERY quickly with the nose down and will exceed redline very easily. A constant speed prop is an advantage in this regard. It is a significant airbrake if you reduce power to idle. If you are going too fast, cut the power to idle immediately.

Stalls

1. Approach stalls – straight and in turns
2. Departure stalls – straight and in turns
3. Stalls in both configurations – with flaps
4. Accelerated stalls – Discuss and demo - BE AWARE of loading!!!
5. Spin awareness

Traffic Pattern work at altitude

1. Enter pattern at 90 kts. Fuel on fullest tank, boost pump on.
2. Downwind at 85 kts. Roll out 20 degrees of flaps
3. Opposite landing point, power to 10" in MP
4. Base leg, rollout full flaps. 75 knots
5. Final, full flaps, final approach 65-70 knots (80 mph)

Takeoffs and landings

1. Landings
 - a. Stabilized approach. Full flaps, 65-70 knots (80 mph)
 - b. Aircraft glide angle is rather flat
 - c. Airspeed control is critical. Don't be fast.
 - d. With the C/S prop you will most likely have to carry power.
 - e. Be aware that short-winged RVs can develop a high sink rate at slow speeds. Be ready. But it takes very little power adjustments. More pronounced in those aircraft with constant-speed props.
 - f. Cross the threshold, slow reduction in power or even keep a little power on. Flare lower than you would in the Cessna. You don't have the high lift to play with so the flare must be done quite low and precisely. DO NOT flare high! Do not allow the airplane to "drop-in".
 - g. Try to duplicate the taxi picture out the front windshield in the flare.
 - h. Be aware of the "delicacy" of the nosewheel. Hold the airplane off so a slow touchdown is accomplished on the main gear with the nose well clear of the runway. Keep the stick back after touchdown and let the nose slowly contact the runway
 - i. Easy on the rudders. Use brakes ONLY as a last resort for deceleration and/or directional control. KEEP THE STICK BACK.
2. Takeoffs
 - a. Check fuel on proper tank, boost pump on, flaps up. Trim set. Look at the trim tab if you can. Always accomplish the memory **Takeoff Check (controls, trim, fuel, canopy)**
 - b. Smoothly and slowly add the power. The CS prop may surge as the power come up. Be prepared for this rapid acceleration. Be ready with right foot. With each pitch change you will need right rudder.
 - c. Slight back pressure as the airplane nears liftoff speed. Let the airplane fly itself off at flying speed.

- d. Accelerate to cruise climb of 110 kts.
 - e. Boost pump off when at a safe altitude. Watch the fuel pressure when you do this. If the engine driven pump has failed, fuel pressure will rapidly go down. Get the boost pump back on if needed.
 - f. If you are staying in the pattern, bring the power right back to 15-17" at pattern altitude and prop to 2400 rpm. You'll be there in no time. Anticipate and do not overshoot pattern altitude.
3. Go arounds
 - a. You don't need full power. You can climb with full flaps. Smoothly add power to 24" mp, maintain level flight or a slight climb. **FLY THE AIRPLANE.** Bring the flaps up in increments.
 - b. Resume a normal climb out.
 4. Short and soft field T/O and landings
 5. Crosswind takeoffs and landings
 - a. Limitations
 - b. Rudder and elevator effectiveness

Emergency procedures

1. Engine failure on takeoff
 - a. ***Straight ahead. MAINTAIN AIRSPEED. FLY THE AIRPLANE TO THE GROUND!!!!!!!!!! You must rapidly reduce the angle of attack.***
 - b. You need well over 1000' AGL to even think about turning back. Don't do it!!!! FLY THE AIRPLANE. DO NOT EVEN CONSIDER RETURNING TO THE AIRPORT UNLESS YOU ARE 100% SURE IT CAN BE ACCOMPLISHED WITH SAFETY.
 - c. If you are higher. Boost pump on, switch tanks, mixture rich, glide at 80kts (92 mph), prop low RPM
2. Engine failure at cruise
 - a. FLY THE AIRPLANE.
 - b. Establish the glide at 80 knots.
 - c. Boost pump on, switch tanks, mixture rich.
 - d. PROP LOW RPM: ***This drastically improves the airplanes glide angle.***
 - e. Pick your landing area into the wind. Come in high as the airplane descends quickly. Maintain 70-80 kts. Use flaps or a slip to bleed off excess altitude. Full stall landing. **FLY THE AIRPLANE TO THE GROUND. DO NOT STALL!!!! NOTE: The RV with its short wings will easily get into a high sink rate situation if the speed gets slow. You need sufficient energy to arrest the sink rate and flare. Thus keep the speed up (best glide of 80 knots or preferably more). You will go down faster, but you will have the necessary energy to flare out and land under control.**
3. We will discuss these other items:
 - a. Fire
 - b. Smoke in cockpit
 - c. Fuel leak
 - d. Canopy unlocked

- e. Loss of brakes on ground
- f. Electrical abnormalities
- g. Aerobatics
- h. Flutter
- i. Fuel contamination – water in fuel
- j. Loss of fuel cap
- k. Lead fouling
- l. Vapor lock and hi temp operations
- m. Density altitude
- n. Jammed controls
- o. Loss of control on ground
- p. Maintenance and service bulletins
- q. Loss of airspeed indicator
- r. Weight and balance and aft CG effect
- s. Spins... Don't!!
- t. Weather accidents and weather planning
- u. Risk management – 3 P's of risk management (Perceive, Process, Perform)
 - i. Weather
 - ii. Night
 - iii. Water
 - iv. Aerobatics

Last words: RVs handle so well that they can lead you into the illusion that you are a better pilot than you really are. **Stay humble and fly with safety as your number one priority!!!!**