Before Takeoff Check (Runup)

Objective

To ensure the applicant learns the purpose of and can exhibit a clear understanding of the Before Takeoff Check procedure and how to perform the procedure properly.

Purpose

No pilot wants to be confronted with an unexpected engine failure or failure of the flight controls at any point during a flight, but these are especially dangerous on takeoff. The Before Takeoff Check and Runup are important procedures which will ensure that the engine and airplane are airworthy and functioning properly. This lesson introduces the Before Takeoff Check and Runup procedures and the importance of a Pre-Departure Briefing.

Schedule

- **Preflight Ground Lesson**: 5 minutes - *In the airplane*
- Initial
  - **Before Flight**: 5 minutes - *Introduction and Demonstration*
- Every Flight
  - **Before Flight**: 5 minutes - *Student Performs*

Equipment

- Airplane Checklist

Student Actions

- Ask any questions, receive study material for the next lesson.
- Watch linked video.
- Review listed references.

Instructor Actions

- Deliver the ground lesson (below) in the airplane before the flight portion begins.
- Demonstrate the procedure in the airplane.
- Debrief after each flight.

Completion Standards

- **Ground**: Student can explain the purpose of the procedure and how to execute it properly.
- **Flight**: Student performs the procedure without assistance, including:
  - Positioning the airplane appropriately with regard to wind, other airplanes, etc.
  - Following the appropriate checklists and performing a flight control check.
  - Performing an engine runup, specifically checking:
    - Temperatures and Pressures, Magnetos, Carb Heat, Idle Check
  - Performing a Pre-Departure Briefing, including:
    - Emergency Procedures, V Speeds, Departure Plan
  - Performing a Pre-Lineup and Lineup check, including:
    - Verifying clearance, ensuring runway is clear, confirming takeoff runway

References

- Ryan Binns - “Cessna 172P Runup (KORL)”
  - YouTube - https://www.youtube.com/watch?v=tbR2ZXEuDwg
- FAA-H-8083-3C (Airplane Flying Handbook) - Chapter 2, Page 21-22 [Before-Takeoff Check/Takeoff Checks]
- Airplane POH - Section 4 [Normal Procedures]
- FAA-S-ACS-6C (Private Pilot ACS) - Area II Task F
- FAA-S-ACS-7B (Commercial Pilot ACS) - Area II Task F
- FAA-S-ACS-25 (CFI ACS) - Area V Task F

Ground Lesson Outline

- Before Takeoff Checklist
  - Read and Do Checklist
    - No hurry, touch each item to confirm
  - Positioning the Airplane
    - Wind, Surface Conditions, Other Aircraft
  - Division of Attention - Inside, Outside
  - Flight Controls Check
    - Verify proper aircraft configuration (e.g. Flaps)
  - Engine Runup - Necessary to ensure proper functioning of engine, magnetos not fouled, etc.
    - Magneto Check - Purpose / Check EGTs, if available
      - What to do in case of a bad Mag Check / Plug Fouling
    - Carburetor Heat Check
    - Proper Engine Indications
      - Temps and Pressure should be in the green, may need to warm up
    - Idle Check
  - Reset Directional Gyro / Heading Bug for Takeoff
- Pre-Departure Briefing
  - Emergency Procedures
    - Land Ahead, Turn Back Altitudes, etc.
  - Brief Takeoff Procedure
    - V Speeds, Abort Point
  - Brief Expected Departure Procedure
    - Traffic Pattern or Turnout Direction
- Pre-Lineup and Lineup Check
  - Confirm cleared for takeoff / Communicate intentions on CTAF
    - Prevent runway incursions!
  - Visually confirm final approach is clear
  - Visually confirm proper runway / Directional Gyro agreement

Common Errors

- **Failure to properly use the appropriate checklist.**
- Improper positioning of the airplane.
- **Improper acceptance of marginal engine performance.**
- **An improper check of flight controls.**
- **Failure to configure the aircraft for takeoff.**
- Hazards of failure to review takeoff and emergency procedures.
- Failure to avoid runway incursions and to ensure no conflict with traffic prior to taxiing into takeoff position.