VII.B. Short Field Takeoff and Maximum Performance Climb

About: Simulating or taking off from a field where the takeoff area is short.

TSW: Develop skill in executing a takeoff and climb at the maximum limit of the airplanes takeoff performance capabilities.

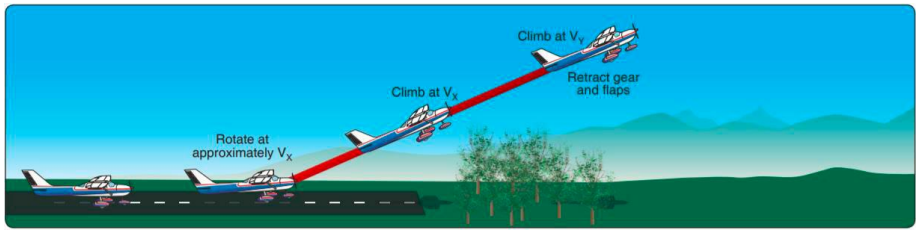
How: This is shown by starting at the very beginning of the runway, rotating at Vx and climbing at Vx until clear of the obstacle.

Procedure:

1. Complete run up and pre-takeoff checklist
2. Receive takeoff clearance or make radio call, check for traffic
3. Refer to POH for your aircraft. For the 1965 C172:
4. Flaps 0°, no carb heat
5. Taxi out onto the runway **using all available runway**
6. Line up on the runway and **come to a complete stop.**
7. Breaks hold
8. Power Full
9. Breaks release, heels to floor **(R-rudder for higher P-factor)**
10. Elevator: hold on ground until Vx (65mph)
11. Rotate at Vx, climb at Vx
12. Announce clear of 50ft obstacle, transition to Vy (80mph)
13. Retract flaps if called for in POH

Discussion Points:

1. Ensure proper trim prior to takeoff
2. Advance throttle smoothly
3. P-factor will be more pronounced: more R-rudder required
4. Airplane will want to lift off before Vx, hold on runway until Vx
5. When turning crosswind reduce R-rudder pressure to stay coordinated.
6. High density altitude reduces engine performance: Longer grd roll.
7. It is not recommended to take off immediately behind other aircraft, especially large aircraft: Wake turbulence



Common errors:

8. Failure to adequately clear the area prior to taxing into position on the active runway.
9. Does not check for traffic before crossing a runway hold line and before entering a taxiway.
10. Failure to check engine instruments for signs of malfunction after applying takeoff power.
11. Failure to utilize all available runway/takeoff area.
12. Failure to have the airplane properly trimmed prior to takeoff.
13. No initial aileron deflection for crosswind
14. Flaps not set as recommended.
15. Improper use of brakes – failure to hold brakes (if recommended)
16. Premature lift-off resulting in high drag
17. Holding the airplane on the ground unnecessarily with excessive forward-elevator pressure.
18. Inadequate rotation resulting in excessive speed after lift-off.
19. Inability to attain/maintain best angle-of-climb airspeed.
20. Premature retraction of landing gear and/or wing flaps – retracting flaps/landing gear before clear of obstacle
21. Drift during climb – allowing airplane to drift away from runway extended centerline; not clearing are directly in front of aircraft during climb.

Evaluations/ Standards:

22. Utilizes procedures before taxiing onto the runway or takeoff area to ensure runway incursion avoidance.
23. Shows knowledge of the elements related to short-field takeoff and maximum performance climb.
24. Positions flight controls for wind conditions, set flaps as recommended.
25. Clears the area, taxies into the takeoff position using maximum available takeoff area and aligns the airplane on the runway center/takeoff path.
26. Applies brakes (if appropriate) while advancing the throttle smoothly to takeoff power.
27. Rotates and lifts off at the recommended airspeed and accelerates to recommended obstacle clearance airspeed or Vx.
28. Establishes a pitch attitude that will maintain the recommended obstacle clearance airspeed, or Vx, +- 5 knots, until the obstacle is cleared, or until the airplane is 50 feet above the surface.
29. Rotates and lifts off at the recommended airspeed and accelerates to Vy.
30. After clearing the obstacle, establishes a pitch attitude for Vy , accelerates to Vy, and maintains Vy, +- 5 knots, during the climb.
31. Retracts the landing gear if appropriate, and flaps clear of any obstacles or as recommended by manufacturer.