

### **Soft-field takeoff©**

Procedure: Flaps as required, yoke full back, high pitch attitude, keep aircraft rolling from run up, at lift off stay within half wing span of ground until  $V_y + 5$  knots, climbs at  $V_y + 10$  and  $- 5$  knots to 200' before flaps up, climb  $V_y$ . Trim, runway alignment, post-takeoff checklist.

The FAA contrived situation is a takeoff area of unlimited length but having a soft surface the nature of which would prevent acceleration of an aircraft to takeoff speed without the application of special techniques. Yoke is held to keep nose wheel off ground as much as possible because of simulated surface conditions. Pitch attitude is held that will get airplane airborne at the slowest possible speed.

The intention is to make a running start on to the runway with 10 degrees of flaps and the yoke held full back. Power is smoothly applied so as to give sufficient elevator power to raise and keep the nose wheel well off the ground. The aircraft is allowed to lift off at minimum flying speed that can be maintained and accelerated only in ground effect. You will be behind the power curve. This means that since you have no more power available you must lower the nose to increase the speed. The aircraft is flown in ground effect until climb speed is attained.

Piloting techniques require that the elbow and arm be locked so that over rotation does not occur with sudden power application. Coordinated power and yoke is required to attain the required/desired smoothness. As the aircraft accelerates the pitch attitude is increased to attain lift off. Controls set for wind and maximum lift. Ground roll clears approach area, with taxi speed sufficient to keep nose wheel from sticking and causing nose to pitch forward. Anticipatory rudder application is very important during this entire takeoff to maintain directional control. You must learn to feel when the tires are no longer rolling on the ground. When this occurs try a slow count to a number like five before beginning to lower the nose. If five doesn't work change the count on the next takeoff.

Unless this speed increase is carefully crafted by combining close flight to the ground and a gradual lowering of the nose an unintentional ground contact is likely. In ground effect the plane can achieve its best acceleration to  $V_y$ . The closer you are able to fly to the ground while avoiding contact the sooner the aircraft will attain the flying speed required for climb. Once  $V_y$  is obtained climb is initiated and reconfiguration of flaps takes place at 200'.

Common mistakes are failing to put in required flaps, not holding yoke all the way back and UP while taxiing on to runway, not keeping plane moving, excessive braking on the clearing turn, failure to keep sufficient pitch attitude, letting aircraft settle to ground after initial liftoff, failing to stay close enough to ground to remaining ground effect, trimming for climb and then forgetting to raise flaps.

REFERENCES: AC 61-21; Airplane Handbook and Flight Manual