

- Fixation on the airspeed indicator during initial climb.
- Premature retraction of landing gear and/or wing flaps.

SOFT/ROUGH-FIELD TAKEOFF AND CLIMB

Takeoffs and climbs from soft fields require the use of operational techniques for getting the airplane airborne as quickly as possible to eliminate the drag caused by tall grass, soft sand, mud, and snow, and may or may not require climbing over an obstacle. The technique makes judicious use of ground effect and requires a feel for the airplane and fine control touch. These same techniques are also useful on a rough field where it is advisable to get the airplane off the ground as soon as possible to avoid damaging the landing gear.

Soft surfaces or long, wet grass usually reduces the airplane's acceleration during the takeoff roll so much that adequate takeoff speed might not be attained if normal takeoff techniques were employed.

It should be emphasized that the correct takeoff procedure for soft fields is quite different from that appropriate for short fields with firm, smooth surfaces. To minimize the hazards associated with takeoffs from soft or rough fields, support of the airplane's weight must be transferred as rapidly as possible from the wheels to the wings as the takeoff roll proceeds. Establishing and maintaining a relatively high angle of attack or nose-high pitch attitude as early as possible does this. Wing flaps may be lowered prior to starting the takeoff (if recommended by the manufacturer) to provide additional lift and to transfer the airplane's weight from the wheels to the wings as early as possible.

Stopping on a soft surface, such as mud or snow, might bog the airplane down; therefore, it should be kept in continuous motion with sufficient power while lining up for the takeoff roll.

TAKEOFF ROLL

As the airplane is aligned with the takeoff path, takeoff power is applied smoothly and as rapidly as the powerplant will accept it without faltering. As the airplane

accelerates, enough back-elevator pressure should be applied to establish a positive angle of attack and to reduce the weight supported by the nosewheel.

When the airplane is held at a nose-high attitude throughout the takeoff run, the wings will, as speed increases and lift develops, progressively relieve the wheels of more and more of the airplane's weight, thereby minimizing the drag caused by surface irregularities or adhesion. If this attitude is accurately maintained, the airplane will virtually fly itself off the ground, becoming airborne at airspeed slower than a safe climb speed because of ground effect. [Figure 5-9]

LIFT-OFF

After becoming airborne, the nose should be lowered very gently with the wheels clear of the surface to allow the airplane to accelerate to V_Y , or V_X if obstacles must be cleared. Extreme care must be exercised immediately after the airplane becomes airborne and while it accelerates, to avoid settling back onto the surface. An attempt to climb prematurely or too steeply may cause the airplane to settle back to the surface as a result of losing the benefit of ground effect. An attempt to climb out of ground effect before sufficient climb airspeed is attained may result in the airplane being unable to climb further as the ground effect area is transited, even with full power. Therefore, it is essential that the airplane remain in ground effect until at least V_X is reached. This requires feel for the airplane, and a very fine control touch, in order to avoid over-controlling the elevator as required control pressures change with airplane acceleration.

INITIAL CLIMB

After a positive rate of climb is established, and the airplane has accelerated to V_Y , retract the landing gear and flaps, if equipped. If departing from an airstrip with wet snow or slush on the takeoff surface, the gear should not be retracted immediately. This allows for any wet snow or slush to be air-dried. In the event an obstacle must be cleared after a soft-field takeoff, the climb-out is performed at V_X until the obstacle has been cleared. After reaching this point, the pitch attitude is adjusted to V_Y and the gear and flaps are retracted. The power may then be reduced to the normal climb setting.

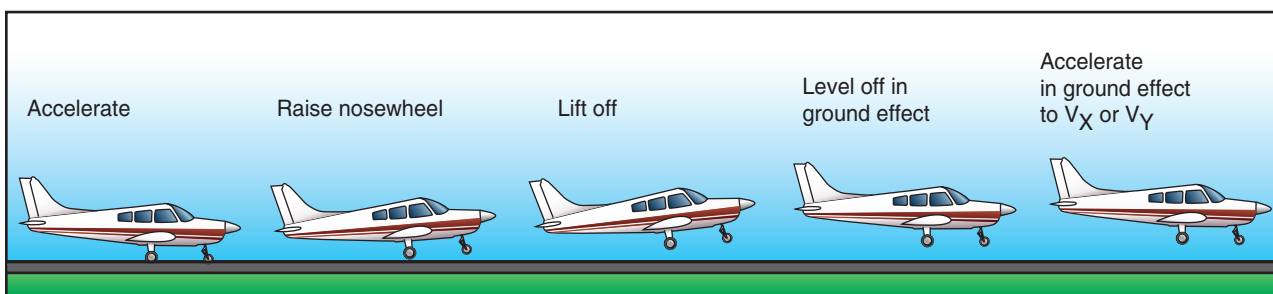


Figure 5-9. Soft-field takeoff.

Common errors in the performance of soft/rough field takeoff and climbs are:

- Failure to adequately clear the area.
- Insufficient back-elevator pressure during initial takeoff roll resulting in inadequate angle of attack.
- Failure to cross-check engine instruments for indications of proper operation after applying power.
- Poor directional control.
- Climbing too steeply after lift-off.
- Abrupt and/or excessive elevator control while attempting to level off and accelerate after lift-off.
- Allowing the airplane to “mush” or settle resulting in an inadvertent touchdown after lift-off.
- Attempting to climb out of ground effect area before attaining sufficient climb speed.
- Failure to anticipate an increase in pitch attitude as the airplane climbs out of ground effect.

REJECTED TAKEOFF/ENGINE FAILURE

Emergency or abnormal situations can occur during a takeoff that will require a pilot to reject the takeoff while still on the runway. Circumstances such as a malfunctioning powerplant, inadequate acceleration, runway incursion, or air traffic conflict may be reasons for a rejected takeoff.

Prior to takeoff, the pilot should have in mind a point along the runway at which the airplane should be airborne. If that point is reached and the airplane is not airborne, immediate action should be taken to discontinue the takeoff. Properly planned and executed, chances are excellent the airplane can be stopped on the remaining runway without using extraordinary measures, such as excessive braking that may result in loss of directional control, airplane damage, and/or personal injury.

In the event a takeoff is rejected, the power should be reduced to idle and maximum braking applied while maintaining directional control. If it is necessary to shut down the engine due to a fire, the mixture control should be brought to the idle cutoff position and the magnetos turned off. In all cases, the manufacturer's emergency procedure should be followed.

What characterizes all power loss or engine failure occurrences after lift-off is urgency. In most instances, the pilot has only a few seconds after an engine failure to decide what course of action to take and to execute it. Unless prepared in advance to make the proper decision, there is an excellent chance the pilot will make a poor decision, or make no decision at all and allow events to rule.

In the event of an engine failure on initial climb-out, the pilot's first responsibility is to maintain aircraft control. At a climb pitch attitude without power, the airplane will be at or near a stalling angle of attack. At the same time, the pilot may still be holding right rudder. It is essential the pilot immediately lower the pitch attitude to prevent a stall and possible spin. The pilot should establish a controlled glide toward a plausible landing area (preferably straight ahead on the remaining runway).

NOISE ABATEMENT

Aircraft noise problems have become a major concern at many airports throughout the country. Many local communities have pressured airports into developing specific operational procedures that will help limit aircraft noise while operating over nearby areas. For years now, the FAA, airport managers, aircraft operators, pilots, and special interest groups have been working together to minimize aircraft noise for nearby sensitive areas. As a result, noise abatement procedures have been developed for many of these airports that include standardized profiles and procedures to achieve these lower noise goals.

Airports that have noise abatement procedures provide information to pilots, operators, air carriers, air traffic facilities, and other special groups that are applicable to their airport. These procedures are available to the aviation community by various means. Most of this information comes from the *Airport/Facility Directory*, local and regional publications, printed handouts, operator bulletin boards, safety briefings, and local air traffic facilities.

At airports that use noise abatement procedures, reminder signs may be installed at the taxiway hold positions for applicable runways. These are to remind pilots to use and comply with noise abatement procedures on departure. Pilots who are not familiar with these procedures should ask the tower or air traffic facility for the recommended procedures. In any case, pilots should be considerate of the surrounding community while operating their airplane to and from such an airport. This includes operating as quietly, yet safely as possible.