



## Aircraft Control After Engine Failure on Takeoff

Studies have shown that startle responses during unexpected situations such as power-plant failure during takeoff or initial climb have contributed to loss of control of aircraft. By including an appropriate plan of action in a departure briefing for a power-plant failure during takeoff or initial climb, you can manage your startle response and maintain aircraft control.

### Considerations for Takeoff Brief

The briefing given by the pilot-in-command (PIC) should be specific for each flight. Avoid allowing the checklist to become routine and create complacency.

- ⇒ **Airport Info:** Consider runway conditions, traffic activities, and airspace complexities.
- ⇒ **Identify V Speeds:** Airspeeds such as  $V_y$ ,  $V_x$ ,  $V_r$  and best glide should be considered for current conditions prior to takeoff.
- ⇒ **Terrain/Obstructions:** Mountains, power-lines, trees or towers may become obstructions during emergencies; identify them prior to departure.
- ⇒ **Abort Point:** Establish an abort point prior to take-off. Abort if you haven't achieved 70% takeoff speed by the runway midpoint.
- ⇒ **After Lift-off:** Once the information above is determined, brief your plan for an engine failure during and after take-off.

### Best Practices

As part of pre-planning and preparation, consider these in case of a power-plant failure during and after take-off. Additional training and practice — in a safe environment with a flight instructor — can reduce the startle response to an unexpected event, such as an actual power-plant failure, and improve outcomes.

- ⇒ **Straight Ahead or Turn Back?** Research indicates a higher probability of survival if you continue straight ahead following an engine failure after take-off. Turning back actually requires a turn of greater than 180 degrees after taking into account the turning radius. Making a turn at low altitudes and airspeeds could create a scenario for a stall/spin accident.
- ⇒ **Practicing the Turn Back:** Turning back to the airport may be a natural reaction to an emergency on takeoff. Aircraft performance, wind, terrain, and your startle response are some areas that need to be considered prior to making the decision to turn around. Practicing this maneuver at a safe altitude will provide you with experience in seeing how much altitude is lost during the turn.



## Training Considerations

- ⇒ Spend time with a flight instructor discussing and reviewing items previously mentioned, and identifying factors that could affect you in the event of an unexpected situation. This will help encourage a thorough pilot briefing prior to departure and enhance your preparedness for unexpected events. Additional factors may be pertinent to your aircraft type, airport environment or other flying conditions.
- ⇒ Receive emergency procedures training to brush up on areas not frequently reviewed and to practice emergency procedures in the aircraft, especially if you are operating a new aircraft and/or new equipment.
- ⇒ While receiving emergency procedures training, consider the altitude required and aerodynamic considerations while performing a 180 degree turn simulating a return to the runway after a power-plant failure after takeoff. This training should be performed at an altitude to ensure a safe recovery in the event of a stall/spin.
- ⇒ Practice landing on a non-paved runway to simulate an emergency landing off airport.
- ⇒ Receive comprehensive upset recovery training by a qualified training provider to enhance aircraft control when reacting to an unexpected events, which may lead to loss of control.

## Additional Resources

- ⇒ **Flight Risk Assessment Tool**  
<http://1.usa.gov/1U1xU0>
- ⇒ **“Managing the Unexpected” GAJSC Fact Sheet**  
<http://1.usa.gov/1UnMn91>
- ⇒ **“Loss of Control-Inflight” Safety Brochure**  
<http://1.usa.gov/1Go16xP>
- ⇒ **“The Impossible Turn?”**  
[http://www.pilotworkshop.com/tips/takeoff\\_impossible\\_turn.htm](http://www.pilotworkshop.com/tips/takeoff_impossible_turn.htm)
- ⇒ **“Engine Failure on Takeoff”**  
[http://www.pilotworkshop.com/tips/engine\\_failure\\_takeoff.htm](http://www.pilotworkshop.com/tips/engine_failure_takeoff.htm)

