



**U.S. Department
of Transportation**
Federal Aviation
Administration

Advisory Circular

Subject: Aircraft Landing Performance and
Runway Excursion Mitigation

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Initiated by: AFS-200/800 **Change:**

This advisory circular (AC) provides ways for pilots and airplane operators to identify, understand, and manage the risks associated with the landing phase of flight. It also provides information that both certificated and noncertificated operators may use to develop personal or standard operating procedures (SOP) to mitigate a runway excursion. The contents of this document do not have the force and effect of law and are not meant to bind the public in any way, and the document is intended only to provide information to the public regarding existing requirements under the law or agency policies.

A handwritten signature in dark ink, reading "Wesley L. Mooty".

Wesley L. Mooty
Acting Deputy Executive Director, Flight Standards Service

CHAPTER 5. RUNWAY OVERRUN HAZARDS

- 5.1 Background.** In addition to being able to predict and assess aircraft performance on a runway, pilots need to understand and account for other hazards that can significantly affect the landing distance required.
- 5.2 Overrun Hazards.** The following hazards have been shown to increase the risk of a runway overrun.
- 5.2.1 Unstabilized Approach.** Deviations in airspeed, altitude, descent rate, glideslope, runway aim point, and localizer control place pilots in a position where recovery to the desired flight path is unlikely. It is the pilot's responsibility to inform ATC when compliance with an instruction will result in an unstabilized approach due to speed or descent rate.
- 5.2.2 Excess Airspeed.** It is critical that the pilot be aware of airspeed during the approach. The recommended approach reference landing airspeed (V_{ref}), plus wind and gust additives, should be maintained until 50 ft over the runway threshold. Excessive approach speed may result in extra speed over the runway threshold and landing beyond the intended touchdown point. In addition to using more runway to touchdown, once the aircraft is on the runway, excessive speed will require more runway to stop, which could lead to a runway overrun. As a rule of thumb, on dry or wet runways, a 10 percent increase in final approach speed results in a 20 percent increase in landing distance. For example, published V_{ref} is 120 knots (kt) with a landing distance of 3,000 ft. If the aircraft crosses the runway threshold at 132 kts, the aircraft will require 3,600 ft to stop.
- 5.2.3 Excessive Height Over the Runway Threshold.** The landing distances provided in the AFM are based on the aircraft being at 50 ft over the runway threshold. For every 10 ft above the standard 50 ft TCH, landing distance will increase 200 ft. For example, if the aircraft crosses the threshold at 100 ft, the required landing distance will increase by 1,000 ft. (Refer to FSF ALAR Briefing Note [8.3](#), Landing Distances.)
- 5.2.4 Landing Beyond the Intended Touchdown Point.** AFM/POH distances are based on a touchdown point determined through flight testing procedures outlined in AC [23-8](#), AC [25-7](#), and AC [25-32](#). If the airplane does not touch down within the air distance included in the AFM/POH landing distance, it may not be possible to achieve the calculated landing distance.
- 5.2.5 High Airport Elevation.** High airport elevation or high-density altitude results in a higher true airspeed, groundspeed, and a corresponding longer landing distance, compared to a lower airport elevation. Pilots should be aware that the performance penalty for high airport elevation can be significant. The AFM/POH usually includes an adjustment for this factor. (Refer to § [25.125\(a\)](#).)
- 5.2.6 Airplane Landing Weight.** Any item that affects the landing speed or deceleration rate during landing affects the landing distance, so the gross weight of the aircraft has a significant effect on landing distance. In other words, the required landing distance varies in direct proportion to the gross weight. For example, a 10 percent increase in landing weight results in a 5 percent increase in landing speed and a 10 percent increase in