IFALPA
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Position

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Vertical Approach Profile

IFALPA believes that the following criteria should apply to all approaches:

1) Wherever terrain clearance considerations do not prohibit such an approach, the final approach segment of any approach should be at a constant slope, ideally 3 degrees, from a height above touch-down of at least 1500 ft, and preferably at least 2000 ft. The minimum height of 1500 ft will enable path stabilization at 1000 ft. The slope should not be intercepted from above by procedure design.

2) Approaches steeper than 3.5 degrees or containing segments steeper than 3.5 degrees, and rates of descent in excess of 1,000 feet per minute below 1,500 feet AAL (above aerodrome level), should only be implemented as an exception and for terrain reasons only.

3) Relevant obstacle data and minimum terrain clearance step-down altitudes should be graphically depicted on approach charts where able.

4) Multi-segment step-down profiles should be replaced by one continuous segment at constant slope, of which the final segment should be as specified in para. 1. The slope of any segment should not exceed a value that allows the aircraft to maintain stabilised approach criteria.

5) Where it is not possible for the final segment to comply with para. 1, a direct approach should not be permitted unless the pilot is visual from at least 1000 ft above touch-down (this limitation may be waived for STOL-type aircraft.)

6) Under no circumstances should a non-precision approach procedure be flown when a precision approach procedure is Available to the same runway.

7) For aircraft with FMS LNAV and VNAV capability, where the applicable non-precision approach is selected from the database, the FMS derived guidance should be used to assist in achieving closer adherence to the non-precision approach track and profile. All published navigational aids for the approach selected should be used to verify position, altitude and track.

RATIONALE FOR A 3 DEGREES APPROACH PATH

Approaches steeper than 3 degrees have safety, operational and capacity concerns. Safety factors include increased pilot workload, reduced path stability, lack of harmonized glidepath angles, different flare characteristics, landing point dispersion, increased risk of hard landing and tailstrike, delayed engine spool-up, and increased influence of atmospheric circumstances (especially tailwind, temperature and icing conditions).

Steep approaches can have a negative impact on airport capacity and throughput due to earlier speed reduction for configuration-induced drag, erratic speed reductions, and increased potential of go-arounds.

The accessibility of aerodromes will be affected because aerodrome minima must be adjusted to cater for the changed go around geometry. Autoland certification restrictions may preclude autoland and Cat II / III landings from steep approach angles.

The effectiveness of steep approaches with respect to noise abatement must be questioned due to interdependency with other operating measures such as delayed flap approach, delayed gear and reduced flap landing. Additional deceleration phases are introduced and earlier aircraft configuration changes will be needed to cater for a steeper approach and this will affect further-out noise. Higher landing flap settings will generally be chosen by the flight crew for path stability and energy management reasons. More frequent power changes and increased aircraft drag may increase generated engine and airframe noise levels.

RATIONALE AGAINST SEGMENTED APPROACH PATHS

Slow engine acceleration

The turbofan engines used in most airliners accelerate relatively slowly from idle speed (approximately 25-30% of maximum thrust) and much more quickly once they have reached around 50% thrust. In a go-around, maximum thrust is required very quickly. Moreover, if a rapid increase in power from idle is applied, the engines may accelerate at differing rates, which in turn may result in thrust asymmetry. In a multi-segment approach the flight path and airspeed requirement may result in engines being at idle thrust even when there is no tailwind component.

High inertia issues

Multi-segment approaches include a number a vertical speed changes late into the approach, whereas the heavy weight and high inertia of most transport category aircraft make it necessary to establish the final approach path, speed, and configuration in good time to achieve stabilised approach criteria by a minimum of 1,000 feet above ground level (AGL).

Operational issues

The variations required in the upper segment of multi-segment approaches, in order to accommodate different aircraft types, greatly increase the complexity of the air traffic control task in maintaining adequate separation. There is also an increased likelihood of wake vortex encounters by aircraft on normal approaches following those on multi-segment approaches. Both these hazards are further increased when visual and instrument flight rules traffic is mixed.

Multi-segment approaches also result in higher workload in a critical phase of flight, possibly further complicated by an unfamiliar operating environment at the conclusion of a lengthy duty period involving multiple time zone changes.

STEEP ANGLED APPROACHES

Approach path angles from 2.5° to 3.5° should be considered ‘conventional’ and there should be no additional flight or system testing beyond the normal certification requirements. IFALPA recommends that, for approach path angles greater than 3.5°, additional flight characteristics, operational procedure, and performance requirement data be determined and documented in the Flight Manual.