



Advisory Circular

Subject: Airport Obstacle Analysis

Date: 5/5/06

AC No: 120-91

Initiated by: AFS-400

1. PURPOSE. This advisory circular (AC) describes acceptable methods and guidelines for developing takeoff and initial climb-out airport obstacle analyses and in-flight procedures to comply with the intent of the regulatory requirements of Title 14 of the Code of Federal Regulations (14 CFR) part 121, §§ 121.177, 121.189, and part 135, §§ 135.367, 135.379, and 135.398 and other associated one-engine-inoperative requirements relating to turbine engine powered airplanes operated under parts 121 and 135. The methods and guidelines presented in this AC are neither mandatory nor the only acceptable methods for ensuring compliance with the regulatory sections. Operators may use other methods if those methods are shown to provide the necessary level of safety and are acceptable to the Federal Aviation Administration (FAA). This AC need not serve as the sole basis for determining whether an obstacle analysis program meets the intent of the regulations. However, the methods and guidelines described in this AC have been derived from extensive FAA and industry experience and are considered acceptable to the FAA when appropriately used. Mandatory words such as "shall" or "must" apply only to those who seek to demonstrate compliance to a specific rule by use of a method set out in this AC without deviation.

2. RELATED REGULATIONS AND DOCUMENTS.

a. Regulations.

- 14 CFR part 1, § 1.1
 - Part 25, §§ 25.105, 25.107, 25.111, 25.113, and 25.115
 - Part 33
 - Part 77
 - Part 91, § 91.167
 - Part 121, §§ 121.97, 121.141, 121.173, 121.177, 121.189, 121.191, 121.443, 121.445
 - Part 135, §§ 135.367, 135.379, 135.381, 135.398
 - Part 152, § 152.11
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(a) If the obstacle itself is the reference point being used for visual course guidance, the minimum allowance is 300 feet for lateral clearance from that obstacle.

(b) When following a road, railroad, river, valley, etc., for course guidance, the minimum allowance is 1,000 feet on each side of the width of the navigation feature. This width should include the meandering and/or curves of the navigation feature being used or the definable center of the valley or river.

(c) When using a lateral visual reference point to initiate a turn, the minimum allowance is plus/minus 0.25 nm along the track at the turn point.

(d) When initiating a turn directly over a visual reference point, the minimum allowance is plus/minus 0.50 nm along the track at the turn point.

(e) When initiating a turn to avoid overflight of a visual reference point, the minimum allowance is plus/minus 1 nm along the track at the turn point.

(5) Visual course guidance may be used as part of an IFR procedure (e.g., SID, DP) or in conjunction with IFR flight during that portion of the operation which is in visual meteorological conditions (VMC). The visual course guidance may be used in combination with other forms of course guidance to construct a one-engine-inoperative departure procedure.

14. ANALYSIS OF TURNS.

Temperature usually has a very large effect on turn radius. First, the turn radius is a function of true airspeed (plus wind), which varies with temperature at the same indicated airspeed. Second, the one-engine-inoperative indicated airspeed (V_2 or V_2 plus an increment) varies considerably with weight, and limit weight is strongly affected by temperature. The temperature effect on both the maximum and minimum turn radii must be taken into account. However, it is acceptable to do a turn analysis based on a single critical temperature if that temperature produces results which are conservative for all other temperatures.

b. **Bank Angle.** Sections 121.189, 135.379, and 135.398 assume that the airplane is not banked before reaching a height of 50 feet, and that thereafter, the maximum bank is not more than 15 degrees. Obstacle clearance at certain airports can be enhanced by the use of bank angles greater than 15 degrees. The following bank angles and heights may be used with operation specification (OpSpec) authorizations (in accordance with section 121.173 (f)). Any bank angles greater than the values shown below require additional specific FAA authorization.

MAXIMUM BANK ANGLES

Height (above Departure End of Runway - feet)	Maximum Bank Angle (degrees)
$h > 400$	25
$400 > h > 100$	20
$100 > h > 50^*$	15

* = Or 1/2 of wingspan, whichever is higher