U.S. Department
of Transportation

Federal Aviation Administration

Advisory Circular

Subject: Airport Design	**Date:** 11/1/2008	**AC No:** 150/5300-13
	Initiated by: AAS-100	**Change:** 14

1. PURPOSE. This Change reschedules the One Engine Inoperative (OEI) implementation date from January 1, 2009, to January 1, 2010.

This Change also incorporates revisions described in the Errata Sheet for Change 13:

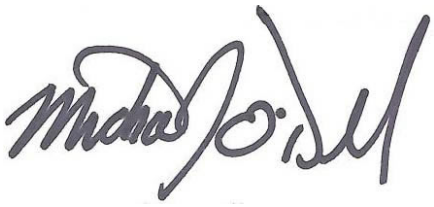
a. Modifies the beginning of paragraph 213 to clarify the applicability of holdline standards to airports without operating control towers.

b. Updates Table 2-2 to correct typographical errors and clarify note 7.

2. CHANGED TEXT. Changed text is indicated by vertical bars in the margins.

PAGE CONTROL CHART

Remove Pages	Dated	Insert Pages	Dated
13–15	6/19/2008	13	11/1/2008
		14	6/19/2008
		15	11/1/2008
16	11/10/1994	16	11/10/1994
101–102	1/3/2008	101	1/3/2008
		102	11/1/2008
103	1/3/2008	103	11/1/2008
104	9/29/2006	104	11/1/2008



Michael J. O'Donnell
Director of Airport Safety and Standards

This page intentionally left blank.

b. Recommendations. Other objects that are desirable to clear, if practicable, are objects that do not have a substantial adverse effect on the airport but, if removed, will enhance operations. These include objects in the controlled activity area and obstructions to air navigation that are not covered in paragraph 211.a, especially those penetrating an approach surface. On a paved runway, the approach surface starts 200 feet (61 m) beyond the area usable for takeoff or landing, whichever is more demanding. On an unpaved runway, the approach surface starts at the end of the area usable for takeoff or landing.

212. RUNWAY PROTECTION ZONE (RPZ). The RPZ's function is to enhance the protection of people and property on the ground. This is achieved through airport owner control over RPZs. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ.

a. Standards.

(1) RPZ Configuration/Location. The RPZ is trapezoidal in shape and centered about the extended runway centerline. The central portion and controlled activity area the two components of the RPZ (see Figure 2-3). The RPZ dimension for a particular runway end is a function of the type of aircraft and approach visibility minimum associated with that runway end. Table 2-4 provides standard dimensions for RPZs. Other than with a special application of declared distances, the RPZ begins 200 feet (60 m) beyond the end of the area usable for takeoff or landing. With a special application of declared distances, see Appendix 14, separate approach and departure RPZs are required for each runway end.

(a) The Central Portion of the RPZ. The central portion of the RPZ extends from the beginning to the end of the RPZ, centered on the runway centerline. Its width is equal to the width of the runway OFA (see Figure 2-3). Paragraph 307 contains the dimensional standards for the OFA.

(b) The Controlled Activity Area. The controlled activity area is the portion of the RPZ to the sides of the central portion of the RPZ.

(2) Land Use. In addition to the criteria specified in paragraph 211, the following land use criteria apply within the RPZ:

(a) While it is desirable to clear all objects from the RPZ, some uses are permitted, provided they do not attract wildlife (see paragraph 202.g., *Wildlife Hazards,* and Appendix 17 for dimensional standards), are outside of the Runway OFA, and do not interfere with navigational aids. Automobile parking facilities, although discouraged, may be permitted, provided the parking facilities and any associated appurtenances, in addition to meeting all of the preceding conditions, are located outside of the central portion of the RPZ. Fuel storage facilities may not be located in the RPZ.

(b) Land uses prohibited from the RPZ are residences and places of public assembly. (Churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of persons typify places of public assembly.) Fuel storage facilities may not be located in the RPZ.

b. Recommendations. Where it is determined to be impracticable for the airport owner to acquire and plan the land uses within the entire RPZ, the RPZ land use standards have recommendation status for that portion of the RPZ not controlled by the airport owner.

c. FAA Studies of Objects and Activities in the Vicinity of Airports. The FAA policy is to protect the public investment in the national airport system. To implement this policy, the FAA studies existing and proposed objects and activities, both off and on public-use airports, with respect to their effect upon the safe and efficient use of the airports and safety of persons and property on the ground. These objects need not be obstructions to air navigation, as defined in 14 CFR Part 77. As the result of a study, the FAA may issue an advisory recommendation in opposition to the presence of any off-airport object or activity in the vicinity of a public-use airport that conflicts with an airport planning or design standard or recommendation.

213. RUNWAY HOLDING POSITION (HOLDLINE). At airports with operating airport traffic control towers, runway holding positions (holdlines) identify the location on a taxiway where a pilot is to stop when he/she does not have clearance to proceed onto the runway. At airports without operating control towers, these holdlines identify the location where a pilot should assure there is adequate separation with other aircraft before proceeding onto the runway. The holdline standards, which assume a perpendicular distance from a runway centerline to an intersecting taxiway centerline, are in Tables 2-1 and 2-2. However, these distance standards may need to be longer and placed in such a way to take into account the largest aircraft (tail, body, or wing tip) expected to use the runway from penetrating the Obstacle Free Zone.

214. to 299. RESERVED

Table 2-1. Runway Separation Standards for aircraft approach categories A & B

ITEM	DIM 1/	AIRPLANE DESIGN GROUP				
		I 2/	I	II	III	IV
Visual runways and runways with not lower than ¾-statue mile (1200m) approach visibility minimums Runway Centerline to:						
Parallel Runway Centerline	H	Refer to paragraphs 207 and 208				
Holdline		125ft 7/ 38m	200ft 60m	200ft 60m	200ft 5/ 60m	250ft 75m
Taxiway/Taxilane/ Centerline 3/	D	150ft 45m	225ft 67.5m	240ft 72m	300ft 90m	400ft 120m
Aircraft Parking Area	G	125ft 37.5m	200ft 60m	250ft 75m	400ft 120m	500ft 150m
Helicopter Touchdown Pad		Refer to Advisory Circular 150/5390-2				
Runways with lower than ¾-statue mile (1200m) approach visibility minimums 4/ Runway Centerline to:						
Parallel Runway Centerline	H	Refer to paragraphs 207 and 208				
Holdline		175ft 7/ 53m	250ft 75m	250ft 75m	250ft 5/ 75m	250ft 6/ 75m
Taxiway/Taxilane/ Centerline 3/	D	200ft 60m	250ft 75m	300ft 90m	350ft 105m	400ft 120m
Aircraft Parking Area	G	400ft 120m	400ft 120m	400ft 120m	400ft 120m	500ft 150m
Helicopter Touchdown Pad		Refer to Advisory Circular 150/5390-2				

1/ Letters correspond to the dimensions on Figure 2-1.

2/ These dimensional standards pertain to facilities for small airplanes exclusively.

3/ The taxiway/taxilane centerline separation standards are for sea level. At higher elevations, an increase to these separation distances may be required to keep taxiing and holding airplanes clear of the OFZ (refer to paragraph 206).

4/ For approaches with visibility less than ½-statue miles, runway centerline to taxiway/taxilane centerline separation increases to 400 feet (120m).

5/ This distance is increased 1 foot for each 100 feet above 5,100 feet above sea level.

6/ This distance is increased 1 foot for each 100 feet above sea level.

7/ The holdline dimension standards pertains to facilities for small airplanes exclusively, including airplane design groups I & II

Table 2-2. Runway Separation Standards for aircraft approach categories C & D 7/

ITEM	DIM 1/	AIRPLANE DESIGN GROUP					
		I	II	III	IV	V	VI
Visual runways and runways with not lower than ¾-statue mile (1200m) approach visibility minimums Runway Centerline to:							
Parallel Runway Centerline	H	Refer to paragraphs 207 and 208					
Holdline		250ft 75m	250ft 75m	250ft 75m	250ft 75m	250ft 6/ 75m	280ft 6/ 85m
Taxiway/Taxilane/ Centerline 2/	D	300ft 90m	300ft 90m	400ft 120m	400ft 120m	3/ 3/	500ft 150m
Aircraft Parking Area	G	400ft 120m	400ft 120m	500ft 150m	500ft 150m	500ft 150m	500ft 150m
Helicopter Touchdown Pad		Refer to Advisory Circular 150/5390-2					
Runways with lower than ¾-statue mile (1200m) approach visibility minimums Runway Centerline to:							
Parallel Runway Centerline	H	Refer to paragraphs 207 and 208					
Holdline		250ft 75m	250ft 75m	250ft 75m	250ft 6/ 75m	280ft 6/ 85m	280ft 6/ 85m
Taxiway/Taxilane/ Centerline 2/	D	400ft 120m	400ft 120m	400ft 120m	400ft 120m	3/ 4/ 3/ 4/	5/ 5/
Aircraft Parking Area	G	500ft 150m	500ft 150m	500ft 150m	500ft 150m	500ft 150m	500ft 150m
Helicopter Touchdown Pad		Refer to Advisory Circular 150/5390-2					

1/ Letters correspond to the dimensions on Figure 2-1.

2/ The taxiway/taxilane centerline separation standards are for sea level. At higher elevations, an increase to these separation distances may be required to keep taxiing and holding airplanes clear of the OFZ (refer to paragraph 206).

3/ For Airplane Design Group V, the standard runway centerline to parallel taxiway centerline separation distance is 400ft (120m) for airports at or below an elevation of 1,345feet (410m); 450feet (135m) for airports between elevations for 1,345 feet (410m) and 6,560 feet (2,000m); and 500 feet (150m) for airports above an elevation of 6,560 feet (2,000m).

4/ For approaches with visibility less than ½-statue mile, the separation distance increases to 500 feet (150m) plus required OFZ elevation adjustment.

5/ For approaches with visibility down to ½-statue mile, the separation distance increases to 500 feet (150m) plus elevation adjustment. For approaches with visibility less than ½-statue mile, the separation distance increases to 550 feet (168m) plus required OFZ elevation adjustment.

6/ This distance is increased 1 foot for each 100 feet above sea level.

7/ For all airplane design groups under aircraft approach category D, this distance is increased 1 foot for each 100 feet above sea level.

Table 2-3. Taxiway and taxilane separation standards

ITEM	DIM 1/	AIRPLANE DESIGN GROUP					
		I	II	III	IV	V	VI
Taxiway Centerline to:							
Parallel Taxiway/ Taxilane Centerline	J	69 ft 21 m	105 ft 32 m	152 ft 46.5 m	215 ft 65.5 m	267 ft 81 m	324 ft 99 m
Fixed or Movable Object 2 and 3/	K	44.5 ft 13.5 m	65.5 ft 20 m	93 ft 28.5 m	129.5 ft 39.5 m	160 ft 48.5 m	193 ft 59 m
Taxilane Centerline to:							
Parallel Taxilane Centerline		64 ft 195. m	97 ft 29.5 m	140 ft 42.5 m	198 ft 60 m	245 ft 74.5 m	298 ft 91 m
Fixed or Movable Object 2 and 3/		39.5 ft 12 m	57.5 ft 17.5 m	81 ft 24.5 m	112.5 ft 34 m	138 ft 42 m	167 ft 51 m

1/ Letters correspond to the dimensions on Figure 2-1.

2/ This value also applies to the edge of service and maintenance roads.

3/ Consideration of the engine exhaust wake impacted from turning aircraft should be given to objects located near runway/taxiway/taxilane intersections.

The values obtained from the following equations may be used to show that a modification of standards will provide an acceptable level of safety. Refer to paragraph 6 for guidance on modification of standard requirements.

Taxiway centerline to parallel taxiway/taxilane centerline equals 1.2 times airplane wingspan plus 10 feet (3 m).

Taxiway centerline to fixed or movable object equals 0.7 times airplane wingspan plus 10 feet (3 m).

Taxilane centerline to parallel taxilane centerline equals 1.1 times airplane wingspan plus 10 feet (3 m).

Taxilane centerline to fixed or movable object equals 0.6 times airplane wingspan plus 10 feet (3 m).

(a) Remove, relocate, or lower (or both relocate and lower) the object to preclude penetration of applicable siting surfaces unless it is fixed by function and/or designated impracticable. Within 6000' of the Table A2-1 surface origin, objects less than or equal to an elevation determined by application of the formula below are allowable.

E + (0.025 x D)

Where:
E = DER elevation
D = Distance from OCS origin to object in feet

(b) Decrease the Takeoff Distance Available (TODA) to preclude object penetration of applicable siting surfaces, with a resulting shorter takeoff distance (the Departure End of the Runway (DER) is coincident with the end of the TODA where a clearway is not in effect); or

(c) Modify instrument departures. Contact the Flight Procedures Office (FPO) for guidance. Objects penetrating by ≤ 35 feet may not require actions (a) or (b); however, they will impact departure minimums/climb gradients or departure procedures.

b. Relevant Factors for Evaluation.

(1) Types of airplanes that will use the runway and their performance characteristics.

(2) Operational disadvantages associated with accepting higher landing/ takeoff minimums.

(3) Cost of removing, relocating, or lowering the object.

(4) Effect of the reduced available landing/takeoff length when the runway is wet or icy.

(5) Cost of extending the runway if insufficient runway length would remain as a result of displacing the threshold. The environmental aspects of a runway extension need to also be evaluated under this consideration.

(6) Cost and feasibility of relocating visual and electronic approach aids, such as threshold lights, visual glide slope indicator, runway end identification lights, localizer, glide slope (to provide a threshold crossing height of not more than 60 feet (18 m)), approach lighting system, and runway markings.

(7) Effect of the threshold change on noise abatement.

5. CLEARANCE REQUIREMENTS. The standard shape, dimensions, and slope of the surface used for locating a threshold are dependent upon the type of aircraft operations currently conducted or forecasted, the landing visibility minimums desired, and the types of instrumentation available or planned for that runway end.

a. Approaches with Positive Vertical Guidance. Table A2-1 and Figure A2-1 describe the clearance surfaces required for instrument approach procedures with vertical guidance.

The Glidepath Qualification Surface (GQS) limits the height of obstructions between Decision Altitude (DA) and runway threshold (RWT). When obstructions exceed the height of the GQS, an approach procedure with positive vertical guidance is not authorized. Further information can be found in the appropriate TERPS criterion.

b. Instrument Approach Procedures Aligned with the Runway Centerline. Table A2-1 and Figure A2-1 describe the minimum clearance surfaces required for instrument approach procedures aligned with the runway centerline.

c. Procedures Not Aligned with the Runway Centerline. To accommodate for offset procedures, increase the lateral width at threshold by multiplying the width specified in the appropriate paragraph by 2 (offset side only). The outside offset boundary splays from this point at an angle equal to the amount of angular divergence between the final approach course and runway centerline + 10 degrees. Extend the outside offset boundary out to the distance specified in the applicable paragraph and connect it to runway centerline with an arc of the same radius. On the side opposite the offset, construct the area aligned with runway centerline as indicated (non-offset side only). The surface slope is as specified in the applicable paragraph, according to Table A2-1. Figure A2-2 is an example of the offset procedure.

d. Locating or Determining the DER. The standard shape, dimensions, and slope of the departure surface used for determining the DER, as defined in TERPS, is only dependent upon whether or not instrument departures are being used or planned for that runway end. See Table A2-1 and Figures A2-1 and A2-2 for dimensions.

Subparagraph 5d(2) applies only to runways supporting Air Carrier departures and is not to be considered a clearance surface.

(1) For Departure Ends at Designated Runways.

(a) No object should penetrate a surface beginning at the elevation of the runway at the DER or end of clearway, and slopes at 40:1. Penetrations by existing obstacles of 35 feet or less would not require TODA reduction or other mitigations found in paragraph 4; however, they may affect new or existing departure procedures.

(2) Departure Runway Ends Supporting Air Carrier Operations.

(a) Objects should be identified that penetrate a one-engine inoperative (OEI) obstacle identification surface (OIS) starting at the DER and at the elevation of the runway at that point, and slopes upward at 62.5:1. See Figure A2-4. **Note:** This surface is provided for information only and does not take effect until January 1, 2010.

Table A2-1. Approach/Departure Requirements Table

	Runway Type	DIMENSIONAL STANDARDS* Feet					Slope/ OCS
		A	B	C	D	E	
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night)	0	60	150	500	2,500	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)	0	125	350	2,250	2,750	20:1
3	Approach end of runways expected to serve large airplanes (Visual day/night); or instrument minimums ≥ 1 statute mile (day only).	0	200	500	1,500	8,500	20:1
4	Approach end of runways expected to support instrument night circling. [1]	200	200	1,700	10,000	0	20:1
5	Approach end of runways expected to support instrument straight in night operations, serving approach category A and B aircraft only. [1]	200	200	1,900	10,000 [2]	0	20:1
6	Approach end of runways expected to support instrument straight in night operations serving greater than approach category B aircraft. [1]	200	400	1,900	10,000 [2]	0	20:1
7 [3, 6, 7, 8]	Approach end of runways expected to accommodate approaches with positive vertical guidance (GQS).	0	½ width runway + 100	760	10,000 [2]	0	30:1
8	Approach end of runways expected to accommodate instrument approaches having visibility minimums ≥ 3/4 but < 1 statute mile, day or night.	200	400	1,900	10,000 [2]	0	20:1
9	Approach end of runways expected to accommodate instrument approaches having visibility minimums < 3/4 statute mile or precision approach (ILS, GLS, or MLS), day or night.	200	400	1,900	10,000 [2]	0	34:1
10	Approach runway ends having Category II approach minimums or greater.	The criteria are set forth in TERPS, Order 8260.3.					
11	Departure runway ends for all instrument operations.	0 [4]	See Figure A2-3				40:1
12	Departure runway ends supporting Air Carrier operations. [5]	0 [4]	See Figure A2-4				62.5:1

* The letters are keyed to those shown in Figure A2-1.

Notes:

1. Lighting of obstacle penetrations to this surface or the use of a VGSI, as defined by the TERPS order, may avoid displacing the threshold.
2. 10,000 feet is a nominal value for planning purposes. The actual length of these areas is dependent upon the visual descent point position for 20:1 and 34:1 and Decision Altitude point for the 30:1.
3. Any penetration to this surface will limit the runway end to nonprecision approaches. No vertical approaches will be authorized until the penetration(s) is/are removed except obstacles fixed by function and/or allowable grading.
4. Dimension A is measured relative to Departure End of Runway (DER) or TODA (to include clearway).
5. Data Collected regarding penetrations to this surface are provided for information and use by the air carriers operating from the airport. These requirements do not take effect until January 1, 2010.

6. Surface dimensions/Obstacle Clearance Surface (OCS) slope represent a nominal approach with 3 degree GPA, 50' TCH, < 500' HAT. For specific cases refer to TERPS. The Obstacle Clearance Surface slope (30:1) represents a nominal approach of 3 degrees (also known as the Glide Path Angle). This assumes a threshold crossing height of 50 feet. Three degrees is commonly used for ILS systems and VGSI aiming angles. This approximates a 30:1 approach angle that is between the 34:1 and the 20:1 notice surfaces of Part 77. Surfaces cleared to 34:1 should accommodate a 30:1 approach without any obstacle clearance problems.
7. For runways with vertically guided approaches the criteria in Row 7 is in addition to the basic criteria established within the table, to ensure the protection of the Glidepath Qualification Surface.
8. For planning purposes, sponsors and consultants determine a tentative Decision Altitude based on a 3° Glidepath angle and a 50-foot Threshold Crossing Height.