U.S. Department
of Transportation

Federal Aviation Administration

Advisory Circular

Subject: Airport Design

Date: 12/30/2011 **AC No:** 150/5300-13

Initiated by: AAS-100 **Change:** 18

1. PURPOSE. This Change removes the One Engine Inoperative (OEI) implementation date from January 1, 2012. Figure A2-4, One-Engine Inoperative (OEI) Obstacle Identification Surface (62.5:1) has also been removed.

A National One-Engine Inoperative (OEI) Policy is under development based on the recommendations from the National OEI Pilot Project. The intent of the new policy is:

- To define an OEI departure area for each departure runway end supporting commercial operations which is agreed to by the airport sponsor or owner and the FAA.
- Where possible, harmonize with International Civil Aviation Organization (ICAO) standards with appropriate flexibility to meet the varying needs of each airport.

OEI is considered an emergency procedure and has been excluded from 14 CFR part 77. The FAA is working on a policy that would consider the impact of OEI procedures in the aeronautical study process conducted under existing part 77 criteria at the core airports to start.

Implementation of the new OEI Policy and guidance in this AC is anticipated for Fall 2012 and will be implemented at a limited number of airports based on need.

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

PAGE CONTROL CHART

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

(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 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 obstacles exceed the height of the GQS, an approach procedure with vertical guidance (ILS, PAR, MLS, TLS, LPV, LNAV/VNAV, etc.) 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, follow the steps in Figure A2-2 to determine the offset boundary. The surface slope is as specified in the applicable paragraph, according to Table A2-1.

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. Note: A National One Engine Inoperative (OEI) Policy is under development based on the recommendations from the National OEI Pilot Project. Implementation is anticipated for Fall 2012.

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 operations, serving approach category A and B aircraft only. [1]	200	200	1,900	10,000 [2]	0	20:1
5	Approach end of runways expected to support instrument night operations serving greater than approach category B aircraft. [1]	200	400	1,900	10,000 [2]	0	20:1
6	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
7	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
8	Approach runway ends having Category II approach minimums or greater.	The criteria are set forth in TERPS, Order 8260.3.					
9	Approach end of runways expected to accommodate approaches with vertical guidance [Glideslope Qualification Surface (GQS).]	0	1/2 width runway +100	760	10,000 [2]	0	30:1
10	Departure runway ends for all instrument operations.	0[4]	See Figure A2-3				40:1
11	Departure runway ends supporting Air Carrier operations. [5]	0[4]					62.5:1

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

Notes:
1. Marking & 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. When obstacles exceed the height of the GQS, an approach procedure with vertical guidance (ILS, PAR MLS, TLS, LPV, LNAV/VNAV, etc.) is not authorized. No vertical approaches will be authorized until the penetration(s) is/are removed except obstacles fixed by function and/or allowable grading (paragraphs 305 and 308).
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. Refer to paragraph 5d(2) for guidance on implementation.

6. Surface dimensions/Obstacle Clearance Surface (OCS) slope represent a nominal approach with 3 degree GPA, 50'TCH, <500' HATh. For specific cases refer to TERPS. The Obstacle Clearance Surface slope (30:1) supports 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 9 is in addition to the basic criteria established within the table, to ensure the protection of the Glidepath Qualification Surface (GQS).
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.

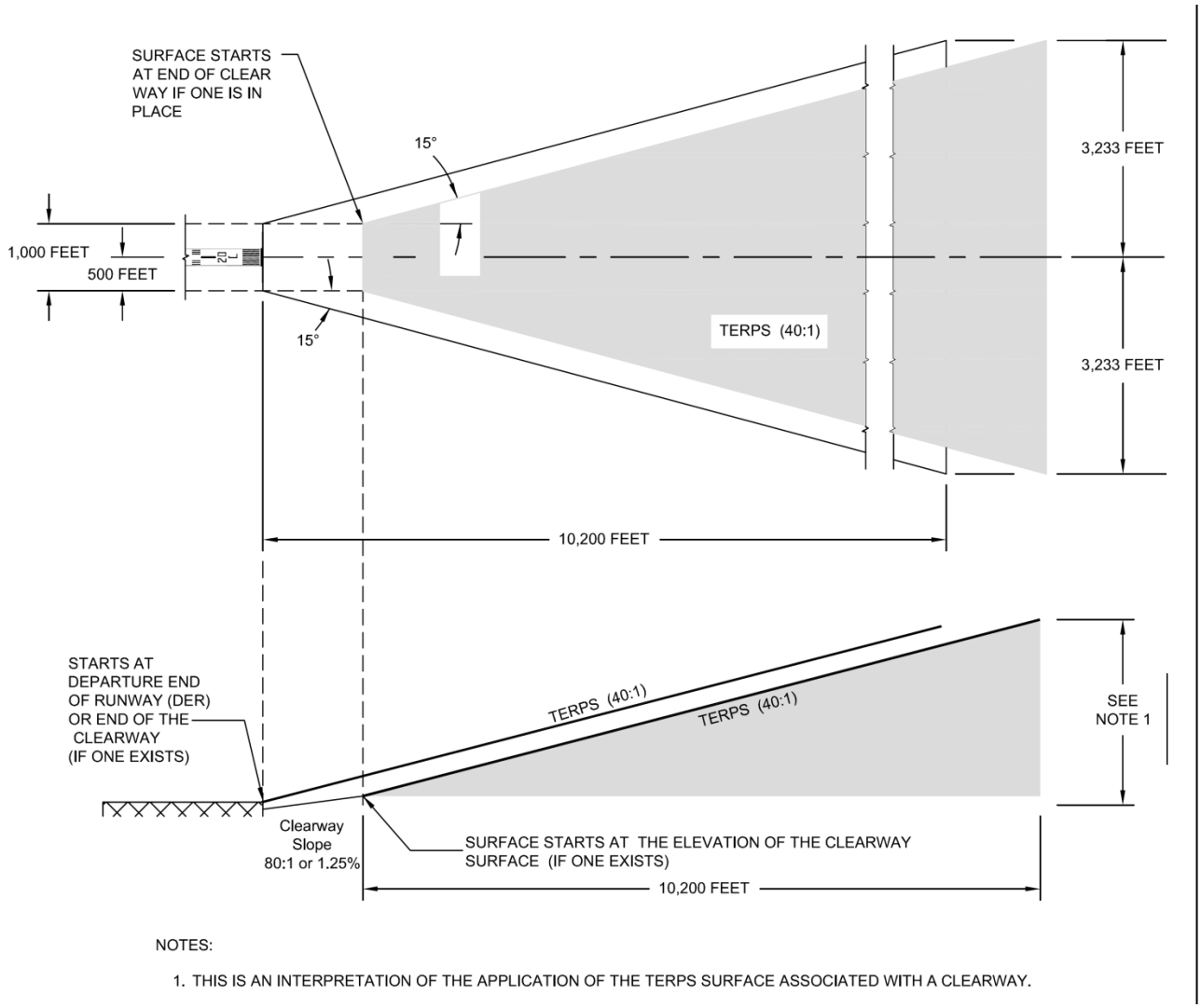

Figure A2-3. Departure surface for Instrument Runways TERPS (40:1)

Figures to be added pending development of National OEI Policy.

Figure A2-4. Nominal One-Engine Inoperative (OEI) Obstacle Identification Surface