

Assignment 4: Runway Separations and Safety Areas

Date Due: February 27, 2017

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Problem 1

Briefly answer the following questions:

- a) An airport has two parallel runways separated by 4,100 feet and zero stagger. Under instrument meteorological conditions, can simultaneous independent parallel operations be conducted to both runways? The airport has a standard surveillance radar with a scan rate of 4.5 seconds.
- b) Use Google Earth and determine if three runways at Charlotte (CLT) can support triple independent parallel operations in IMC conditions. If the airport can do this, state the runways that can support triple independent approaches.
- c) Los Angeles International Airport (LAX) has two Northern runways spaced 720 feet apart (see Google Earth): Runways 24R and 24L. Can simultaneous operations with small aircraft (say FAA design groups II or lower) be conducted at these two runways in VMC conditions? State the rule that applies.
- d) Find if Philadelphia International Airport can conduct independent arrival and departure procedures from runways 27L and 27R in marginal weather conditions (3 nm visibility). The airport has a fast-scan PRM radar. State the rule that applies.
- e) Can Boston Logan airport conduct simultaneous independent arrivals to runways 4R and 4L in bad weather conditions? Explain.
- f) What air traffic control service is responsible for separating aircraft 100 nm from the nearest airport?
- g) Name the air traffic control service that does not control flights directly. Only supplies aviation information to pilots.

Problem 2

Answer briefly the following questions.

Airnav.com webs site lists the following declared distances (in feet) for Runway 33L at Boston Logan airport:

TORA:10083 TODA:10083 ASDA:10083 LDA:10083

a) Use Google Earth to verify the values for all four declared distances. Comment any discrepancies observed. Assume the critical aircraft is a Boeing 747-400. Runway 33L is a precision runway with approach visibility minima of less than 3/4 mile.

b) Suppose we want to protect the runway safety area prior to the landing threshold and also the runway safety area after the landing on runway 33L. Is the value of LDA 10,083 feet? Explain.

Roanoke Regional Airport (ROA) lists the following declared distances (in feet) for runway 24 (taken from airnav.com):

TORA:6800 TODA:6800 ASDA:6800 LDA:6010

c) Explain why is the LDA 6,010 feet vs. 6800 feet for the ASDA.

Use Google Earth to study LGA runway thresholds 22 and 13. Answer the following questions:

d) Determine the runway safety area dimensions for both runways if a Boeing 757-200 is the largest aircraft flying to LGA.

e) What could you do to improve this airport with special emphasis on runways ends 22 and 13? Explain.

Problem 3

a) An airline operates Boeing 787-8 aircraft to an airport with a single precision runway as shown in Figure 1. The airline is proposing building a 90-foot tall hangar to be located 500 feet perpendicular from the runway centerline as shown in Figure 1. Perform the necessary analysis to determine if the proposed hangar violates the runway Obstacle Free Zone (OFZ) (see Figure 1). The runway is a precision runway with a Category 1 Instrument Landing System (ILS). State the dimensions of the OFZ for this runway.

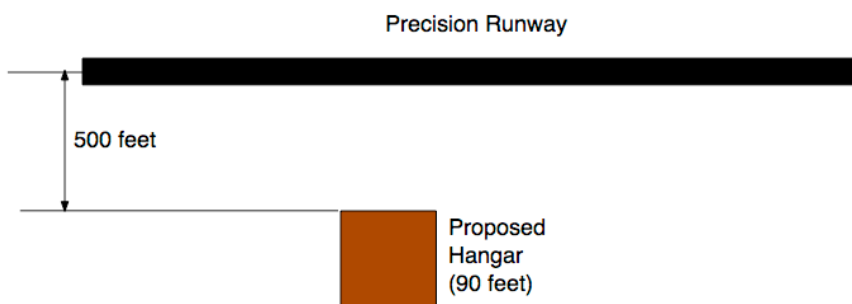


Figure 1. Proposed Hangar Location.

b) Draw to scale the cross section of the inner transitional OFZ surface for this problem and show the dimension of the proposed hangar. Refer to Figure 3-4 of FAA Advisory Circular AC 150/5300-13 for details or consult out course notes.

Problem 4

A well-known airport in the West Coast of the United States has a runway configuration shown in Figure 2.

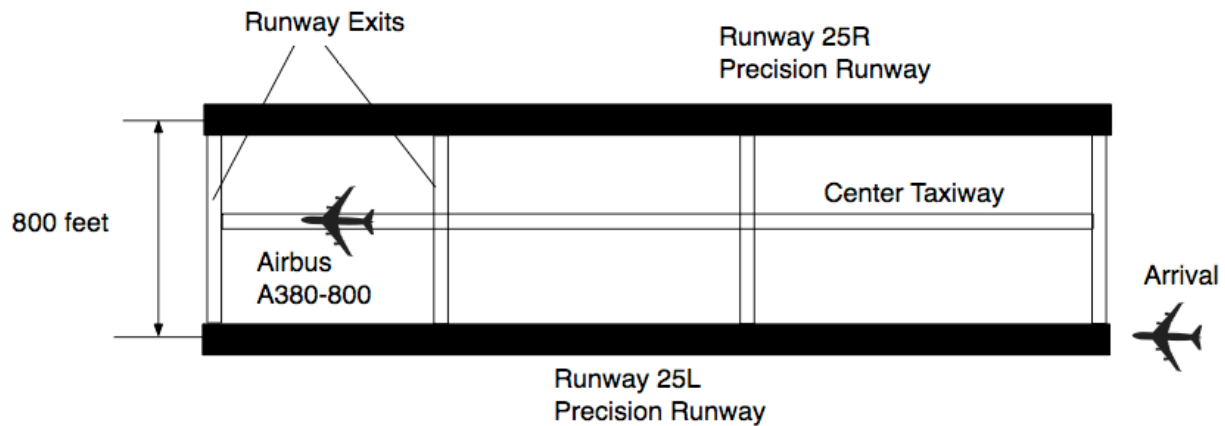


Figure 2. Airport Runway Configuration.

In paragraph 306 of the AC 150/5300-13, the FAA defines the Obstacle Free Zone (OFZ) as:

“ 306. OBSTACLE FREE ZONE (OFZ). The OFZ clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function.”

- An Airbus A380-800 taxis in the center taxiway after landing. Does the vertical tail of the A380-800 penetrate the runway OFZ if both runways are precision runways (assume Category 1 ILS)?
- What should be the minimum separation between parallel runways allowing a Boeing 767-400 aircraft to taxi on the center taxiway without penetrating runway 25L OFZ?