

Assignment 6: Obstruction Standards and Declared Distances

Date Due: March 19, 2014

Problem 1

- The airport authority wants to know if the objects near an airport constitute obstacles to navigation. The proposed location of these objects is shown in Figure 1. Determine if each object is an obstruction to navigation. State which surface is critical (i.e., in violation). The runway has a length of 8,200 feet precision runway. The locations of the objects are shown as (x,y) distances (in feet) from the runway threshold as shown.
- Find if any of the objects violates the new FAA runway site requirements.
- Draw the five imaginary surfaces for this single runway. Use the application of your choice.

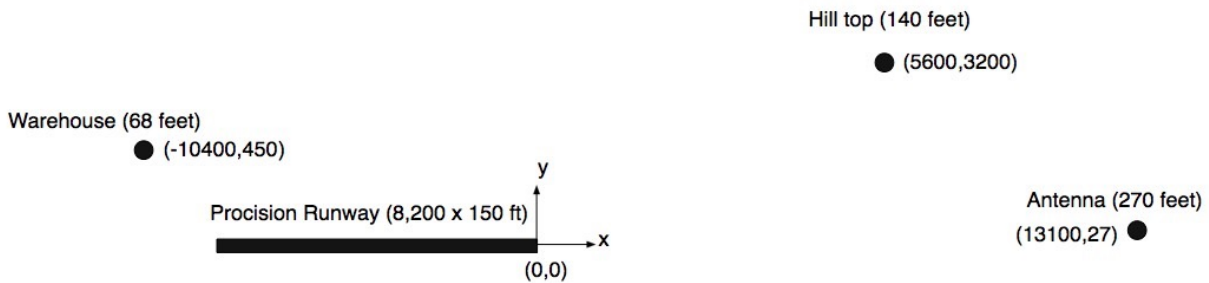


Figure 1. Potential Obstructions to Navigation for Problem 1.

Problem 2

The airport shown in the figure has a single runway with some potential obstacles as shown in the graphic. The runway is a precision runway with approaches with visibility minimums down to 1/2 mile. The first 200 feet on the west side are flat and then slope uniformly to 20 feet above the runway level. A railroad track is located in the flat section of the ground 560 feet from the runway end.

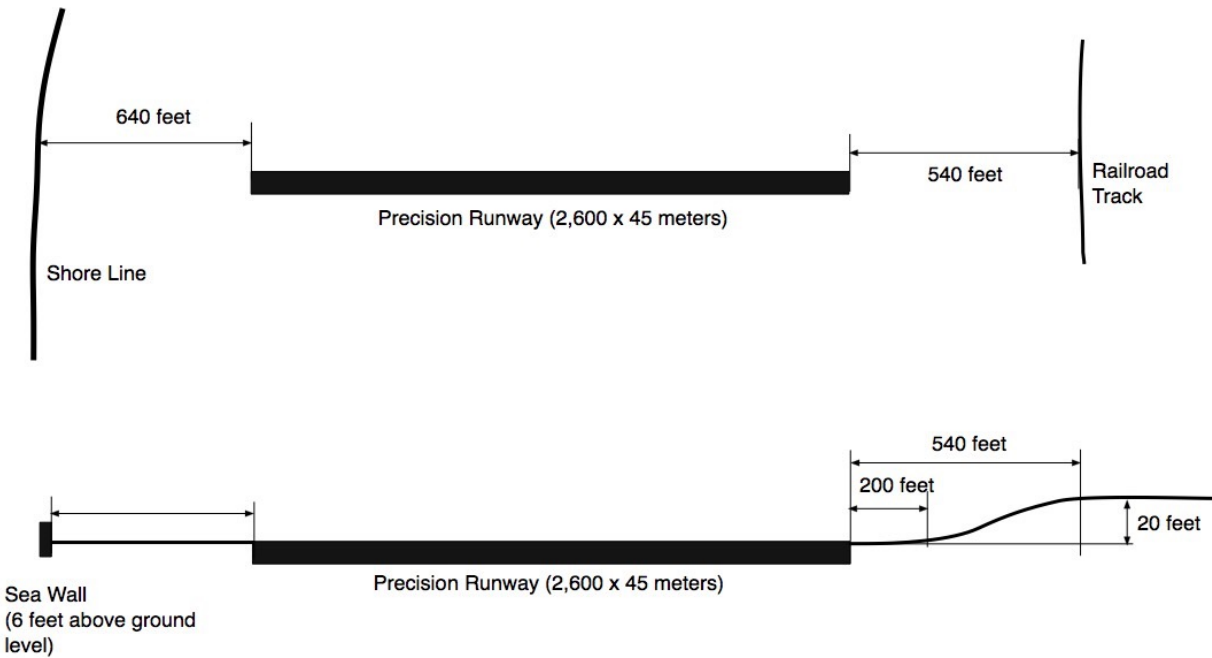


Figure 2. Existing Airport Runway for Problem 2.

- Determine the declared distances available (LDA, ASDA, TODA and TORA) for the runway if aircraft land from the East (assume the right side of the figure). Consider Runway Safety Area requirements and also consider new FAA runway siting requirements (i.e., approach and departure surfaces).
- Estimate the LDA if aircraft approach from the waters instead.
- Based on your analysis, is there a need for a displaced threshold? Explain.

Problem 3

An airport receives a request to build a Hangar to accommodate 2 Boeing 747-400 simultaneously (see Figure below). The hangar has a maximum height of the Boeing 747-400 plus an additional 15 feet for clearance and mounting of internal cranes to move heavy equipment inside the hangar.

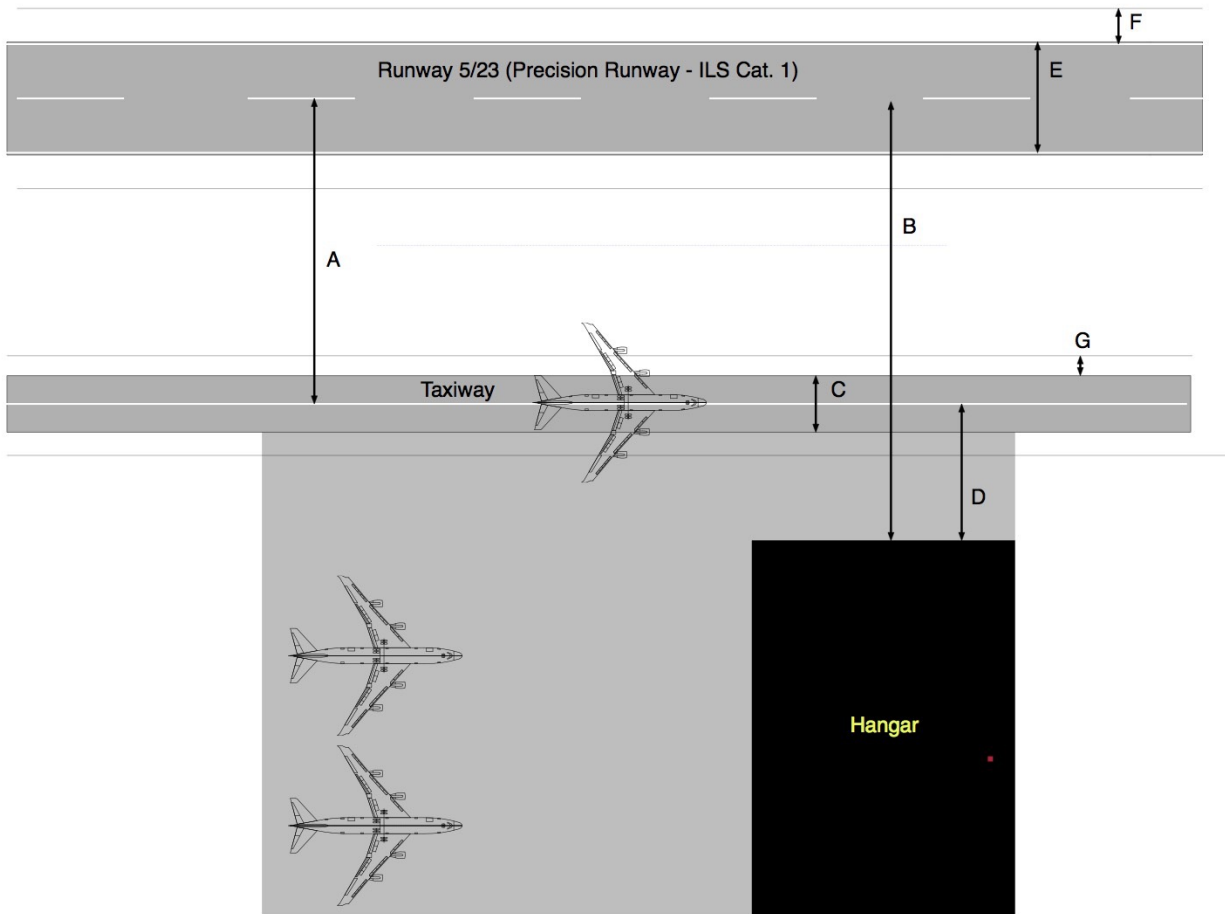


Figure 2. Proposed Hangar at Airport for Problem 3.

- Perform the necessary analysis to determine the **minimum distance B** that will not violate the runway Obstacle Free Zone (OFZ) or other runway protection surfaces. Runway 5/23 is a precision runway with a Category 1 Instrument Landing System (ILS). State the dimensions of the OFZ for this runway.
- Perform a separate analysis to determine if the proposed hangar location will not violate any of the 5 imaginary surfaces of FAR Part 77.
- Based on the two analyses above, what is the minimum distance to the hangar.
- Determine the distances A, C, D, E, F and G for this problem. Use the same critical aircraft (Boeing 747-400).

Problem 4

A new airport is expected to serve regional airline operations using aircraft such as the Bombardier Dash 8-300 aircraft. The runway length needed has been estimated to be 1,400 meters. The airport is located at an elevation of 1,760 feet above mean sea level conditions. The airport will have a non-precision runway and serve approaches with visibility minima down to 1 mile. Determine the following dimensions for your design:

- a) The length and width of the approach and departure surfaces for the airport
- b) The elevation of the horizontal surface above mean sea level conditions
- c) The radius of the horizontal surface for the runway.
- d) The length and slope of the conical surface.
- e) The slope of the Obstacle Clearance Surface (OCS).