

Assignment 7: Airport Geometric Design Standards

Date Due: October 30, 2024

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Problem 1

A new airport is designed with two satellite terminal buildings, as shown in Figure 1. The gates can accommodate aircraft up to the size of an Airbus A321neo.

a) Find the dimensions A through R in Figure 1. Ensure that your design allows pilots entering the gate position to maneuver with steering angles no more than 50 degrees. Assume the service roads have 12-foot wide lanes. Use the new design criteria to satisfy the taxilane object-free areas.

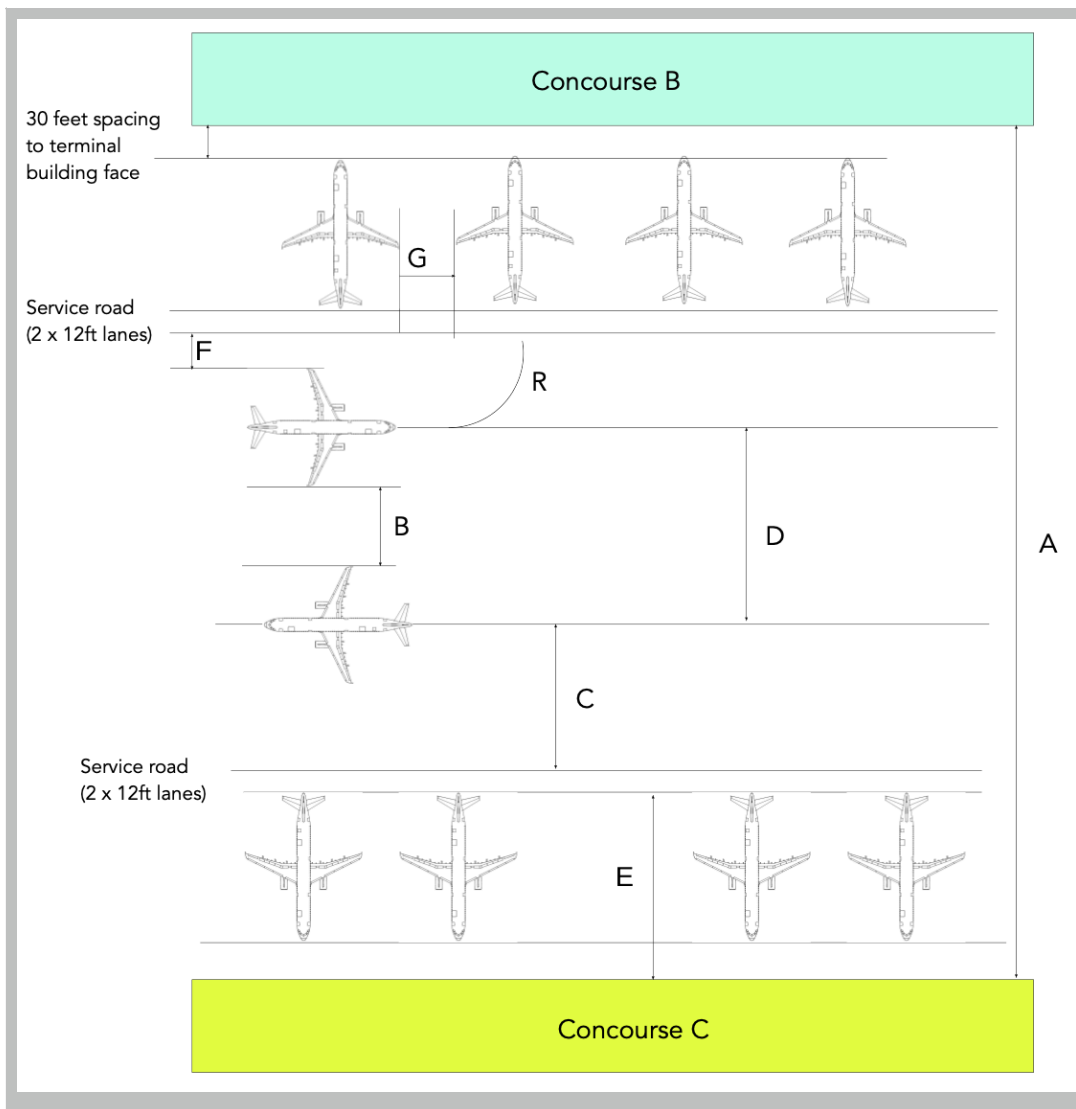


Figure 1. Airport Dual-Taxilane Configuration for Problem 1.

b) Estimate the steering angle and wingtip radius of the Airbus A321neo for the centerline radius R selected in part (a) of the problem. Consult Section 4 of the corresponding Airbus airport design and planning document.

c) Compare the dimensions of your design at the gate with the typical gate layout dimensions recommended by Airbus for the A321neo (Section 5 in the Airbus A321neo airport design document - see the Typical Ramp Layout (Gate) figure). Comment on any differences.

Problem 2

- Use the FAA Taxiway Fillet Design Tool to design a 135-degree taxiway-taxiway connector for the Airbus A220-300 (see Figure 2). Your design should include all dimensions needed to construct the taxiway fillets (three segment lengths $L-1$, $L-2$, $L-3$; three taxiway widths $W-0$, $W-1$, $W-2$, $W-3$; and two radii dimensions R -Fillet and R -Outer. For your design, use a 100-foot centerline radius.
- Tell me the steering angle produced in the design of part (a). Is the steering angle acceptable?
- For the Airbus A220-300 what does FAA require the minimum centerline radius on the 135-deg. Taxiway junction?
- Find the steering angle required for the design implemented in part (a).
- Use the FAA FAA Taxiway Fillet Design Tool to produce a simple CAD drawing of the taxiway-taxiway connector design in part (a). Show the detailed geometry in the CAD software with dimensions (no hand sketches accepted). You can export the DXF file produced by the FAA Taxiway Design Tool.

Note: If the FAA Taxiway Design Tool does not work on your computer, use the tables in Appendix J of the FAA Advisory Circular 150/5300-13B to implement your design. You must still draw the solution in part (a) using CAD.



Figure 2. Airbus A220-300 Landing at Atlanta Hartsfield-Jackson International Airport (A. Trani).

Problem 3

An airport is expected to have two parallel taxiways to serve Airbus A321neo and Boeing 737-Max9 aircraft taxiing in opposite directions. Specify the following dimensions:

- a) Distance between parallel taxiway centerlines.
- b) Find the minimum distance between the taxiway centerline and a movable object.
- c) Find the dimension of the taxiway shoulder used in the design.
- d) Find the taxiway edge safety margin used in the design.
- e) State the dimensions of the Taxiway OFA and Taxiway Safety Areas (TSA).

Problem 4

Specify the dimensions of a crossover taxiway designed for the Boeing 737-Max9 and Airbus A321neo. Your design should be based on the TDG group design criteria. Assume the aircraft will reverse direction while using the crossover taxiway.

- a) Find the recommended taxiway centerline to taxiway centerline distance.
- b) Find the three fillet lengths L-1, L-2, and L-3 for the crossover taxiway.
- c) Find the taxiway fillet design widths (W-0, W-1, W-2, and W-3).
- d) Find the recommended centerline and fillet radii.