

APPENDIX 3. ENHANCED MARKINGS FOR RUNWAY HOLDING POSITION.

1. GENERAL. Enhanced taxiway markings are intended to provide additional visual cues to taxiing pilots to help them identify the location of the runway holding position. This appendix provides standards for these enhanced markings and guidance, including examples, on where to use the enhanced markings.

The figures included in this appendix are not drawn to scale.

2. APPLICABILITY. The guidelines and standards contained in this appendix for enhanced taxiway markings may be used as a runway incursion prevention initiative. They may be used in combination or separately with existing taxiway markings. However, all intersections at an airport must use the same combination of markings.

3. ENHANCED TAXIWAY CENTERLINE MARKINGS.

a. Purpose. Enhancements to a taxiway centerline provide additional visual cues to pilots of an upcoming runway holding position.

b. Location. Taxiway centerlines are enhanced for 150 feet (45.7 m) prior to a runway holding position marking, except in the situations described in Paragraph 3.d. below. The taxiway centerline is not enhanced between the runway holding position marking and the runway.

The following methods are commonly used to measure the 150-foot (45.7 m) length on a curved taxiway from the runway holding position:

(1) With a measuring wheel, measure from the intersection of the taxiway centerline at the runway holding position along the existing taxiway centerline out to 150 feet (45.7 m).

(2) With a 150-foot (45.7 m) tape measure, swing an arc from the intersection of the taxiway centerline at the runway holding position until it intersects the taxiway centerline.

c. Color. Enhanced taxiway centerline markings are yellow and must contain glass beads. In addition, the enhanced taxiway centerline marking must be outlined in black paint on light-colored pavements.

d. Characteristics. An enhanced taxiway centerline marking consists of a parallel line of yellow dashes on either side of the existing taxiway centerline. (See Paragraph 21 of this advisory circular for taxiway centerline marking standards.). The first dashes start 6 to 12 inches (15–30 cm) from the runway holding position marking, and the pattern is repeated for a distance of 150 feet (45.7 m). The yellow dashes are 9 feet (2.74 m) in length and 6 inches (15 cm) wide and have a gap of 3 feet (1 m) between them, as shown in Figure C-1.

(1) If the taxiway centerline to be enhanced continues through a taxiway/taxiway intersection that is located within 150 feet (45.7 m) of a runway holding position marking, the taxiway centerline enhancement must be terminated 5 feet (1.5 m) prior to the point where the other taxiway centerline crosses the enhanced taxiway centerline (see Figure C-9).

(2) If the enhanced taxiway centerline intersects another runway holding position marking that is located within 150 feet (45.7 m) of a runway holding position marking, then the entire taxiway centerline between the two runway holding position markings must be enhanced. However, in no case should the taxiway centerline be enhanced between the runway holding position marking and the runway (see Figure C-9).

(3) Where two taxiway centerlines come together (converge) at or before the runway holding position marking, there must be no partial dashed lines less than 9-feet (2.74 m) at the point of convergence. The first inside dashed lines must be aligned with the outside dashed lines— starting and stopping with the dashed lines on the outside (see Figure C-2).

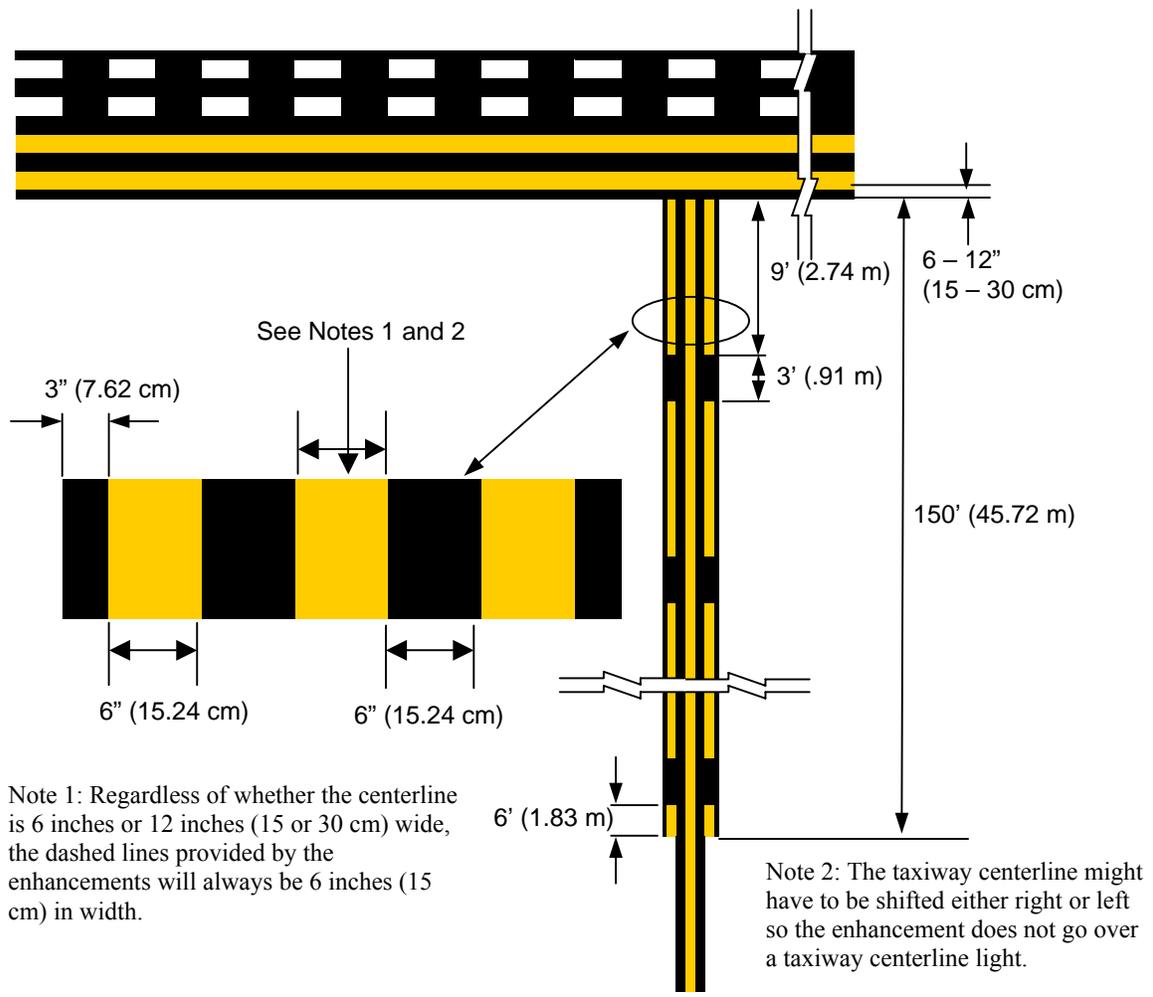


Figure C-1. Enhanced Taxiway Centerline Markings



Note: There must be no partial dashed lines less than 9-feet (2.74 m) at the point of convergence. The first inside dashed lines must be aligned with the outside dashed lines—starting and stopping with the dashed lines on the outside, as shown in the figure above.

Figure C-2. Dashed Lines at Converging Taxiway Centerlines

4. ENHANCED RUNWAY HOLDING POSITION MARKINGS ON TAXIWAYS.

a. Purpose. Enhanced runway holding position markings on taxiways provide additional visual cues to alert pilots of an upcoming runway holding position.

b. Location. In accordance with Paragraph 23, Runway Holding Position Markings on Taxiways, enhanced holding position markings should be located in accordance with Table 4 on all taxiways that intersect runways based on the most critical aircraft using the runway.

c. Color. The enhanced holding position marking on a taxiway is comprised of lines of two colors—parallel dashed white lines and solid yellow lines. Using white dashes helps distinguish the runway side from the holding side of the marking. Enhanced holding position markings on taxiways must be outlined in black on light-colored pavements and must contain glass beads.

d. Characteristics.

(1) Except for their color, the characteristics of enhanced runway holding position markings on taxiways remain the same as those for standard runway holding position markings on taxiways, as specified in Paragraph 23. The enhanced runway holding position markings consist of a set of two dashed white lines, two solid yellow lines, and three spaces, each 12 inches (30 cm) wide, as shown in Figure C-3.¹ The solid yellow lines of these markings are always on the side where the aircraft is to hold. The dashed white lines are always on the runway side of the holding position and are consistent with white runway markings.

(2) The runway holding position marking on a taxiway also can be enhanced by extending the width of the marking onto the paved shoulder to within 5 feet (1.5 m) of the pavement edge or 25 feet (7.5 m) from the edge of the taxiway, whichever is less.

(i) Taxiway edge markings must be removed for the width of the extended holding position marking.

(ii) Standards for outlining the extended runway holding position marking on a taxiway remain the same (see Appendix 2).

(iii) If the holding position marking is outlined in black, taxiway edge markings should abut the black outline on both sides (solid yellow line and dashed white line).

(iv) If the holding position marking is not outlined in black, taxiway edge markings should abut the holding position marking on both sides (solid yellow line and dashed white line).

¹ At airports that do not have an airport traffic control tower and are not certificated under 14 CFR Part 139, each of the two solid yellow lines, two dashed white lines, and three spaces may be 6 inches (15 cm) wide.

(v) If the paved shoulder is only available on one side of the taxiway, the holding position must only be extended on the available side.

(vi) If a light fixture or sign is located on the taxiway shoulder and aligned with the extended holding position marking, the extended holding position marking must be extended no closer than 5 feet (1.5 m) to the edge of the light or sign.

(vii) If a taxiway has taxiway shoulder markings (see Paragraph 31, Taxiway Shoulder Markings) and the extended holding position marking will be located within 10 feet (3.05 m) of the taxiway shoulder marking, the extended holding position marking must supersede the taxiway shoulder marking, i.e., the taxiway shoulder marking must be omitted in that location.

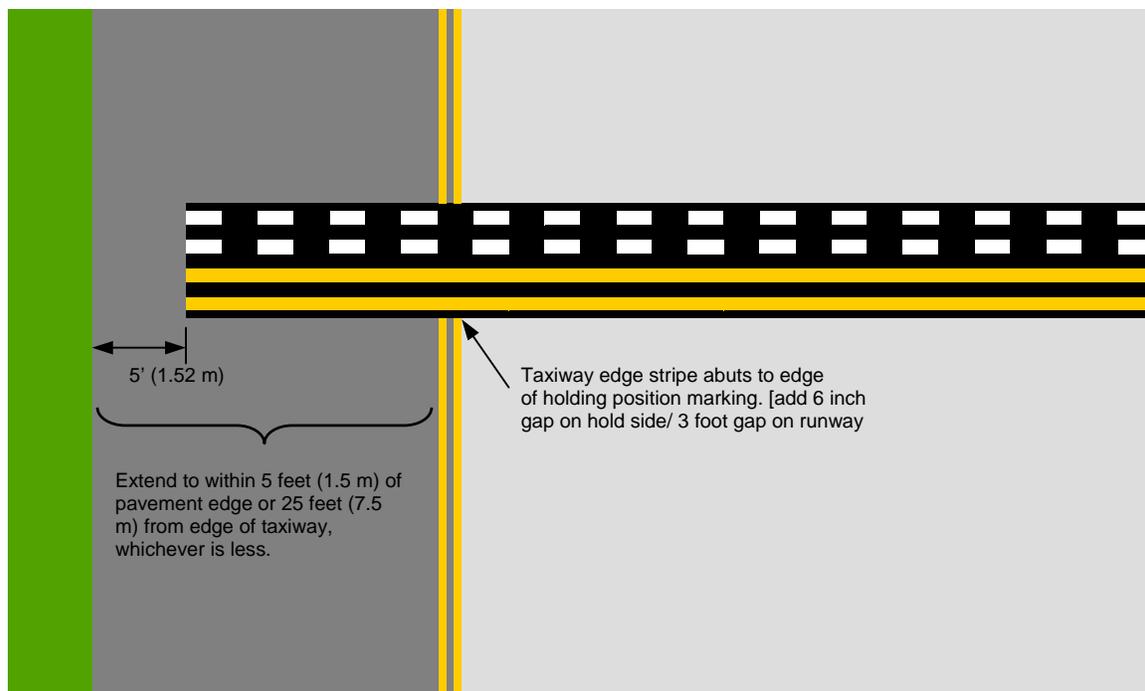


Figure C-3. Enhanced Runway Holding Position Markings on Taxiways

5. ENHANCED SURFACE PAINTED HOLDING POSITION SIGNS.

a. Purpose. Enhanced surface painted holding position signs provide additional visual cues to alert pilots of an upcoming runway holding position, identify the location as a runway holding position, and confirm the runway designation.

b. Location. The enhanced surface painted holding position sign must be located in the same manner as described in Paragraph 26, Surface Painted Holding Position Signs, as supplemented by the guidance that follows in this paragraph. In addition to a surface painted holding position sign located to the left of the taxiway centerline, an additional surface painted holding position sign must be installed in a similar manner to the right of the taxiway centerline. It might not be possible to install surface painted holding position signs on both sides of the taxiway centerline, particularly where taxiway centerlines converge just prior to the runway holding position marking. In these cases, the surface painted holding position signs may be omitted on one side.

(1) The surface painted holding position signs should be located:

(i) Parallel to the runway holding position marking at a distance of 2 feet (.67m) to 4 feet (1.34m) prior to the holding position marking to allow clearance of in-pavement runway guard lights and/or stopbars (see Figures C-4 and C-5).

(ii) At a distance of 3 to 10 feet (1–3.05 m) from the taxiway centerline. If the holding position marking and the taxiway centerline are not perpendicular to each other, then this distance should be measured from the taxiway centerline to the nearest corner of the surface painted holding position sign (see Figure C-4A).

(2) Surface painted holding position signs located between two taxiway centerlines must be—

(i) Parallel to the runway holding position marking.

(ii) Approximately equidistant from both taxiway centerlines at a distance of no less than 3 feet (1 m) or more than 15 feet (4.57 m) from either taxiway centerline as measured from the taxiway centerline to the nearest corner of the surface painted holding position sign.

(3) If two or more taxiway centerlines intersect the runway holding position marking or intersect each other within 15 feet (4.57 m) of the runway holding position, there might not be enough space for two or more surface painted holding position signs. These locations will require individual assessment for applying surface painted holding position signs that take into account such factors as taxi route usage rate and space available.

c. Color. As specified in Paragraph 26, Surface Painted Holding Position Signs, the surface painted holding position sign has a red background with a white inscription and must be outlined in black on light-colored pavements.

d. Characteristics. As specified in Paragraph 26, Surface Painted Holding Position Signs, the inscription must have a height of 12 feet (3.67 m); however it may be reduced, as necessary, to the minimum height of 9 feet (3 m). If it is necessary to reduce the height below 12 feet at one location on the airport, all surface painted holding position signs on the airport should be reduced to the same height in order to avoid the need for multiple stencils. The width of the letters, numbers, and other symbols used in the inscription must be proportional to the height so they conform in appearance to the letters, numbers, and other symbols in Appendix 1. The background is rectangular and extends a minimum of 15 inches (38 cm) laterally and vertically beyond the extremities of the inscription. The Surface Painted Holding Position Sign may be eliminated if it would extend onto another taxiway.

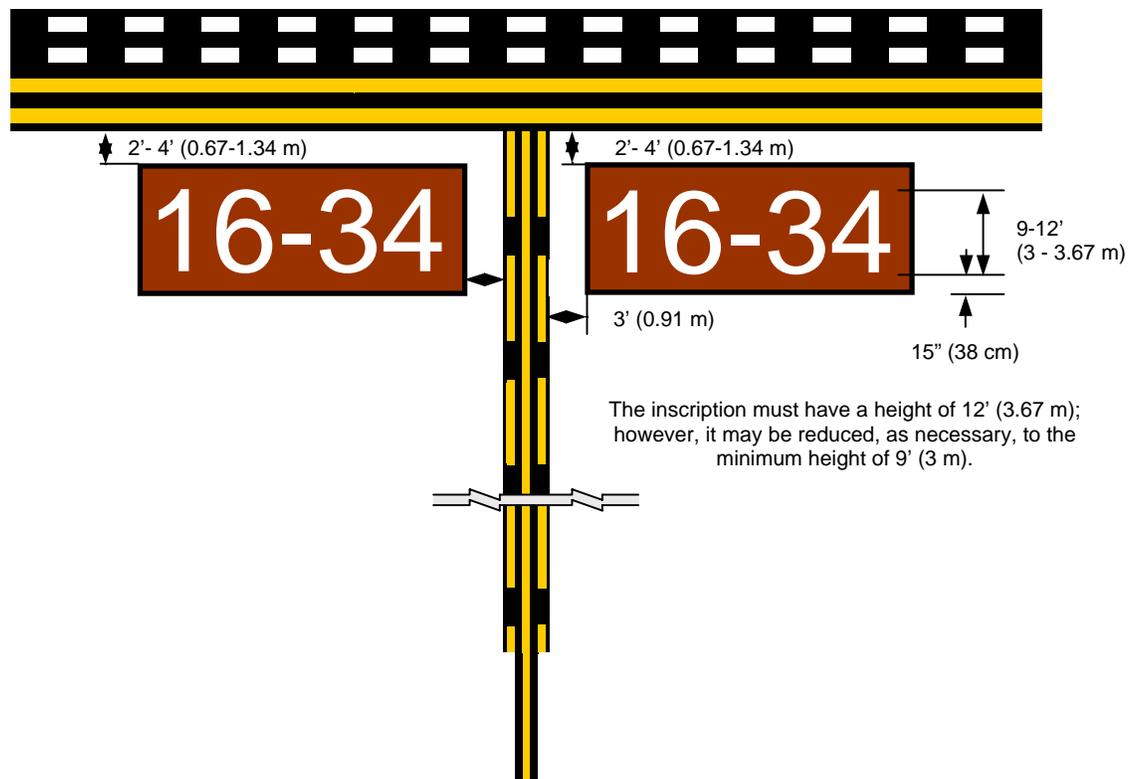


Figure C-4. Surface Painted Holding Position Signs

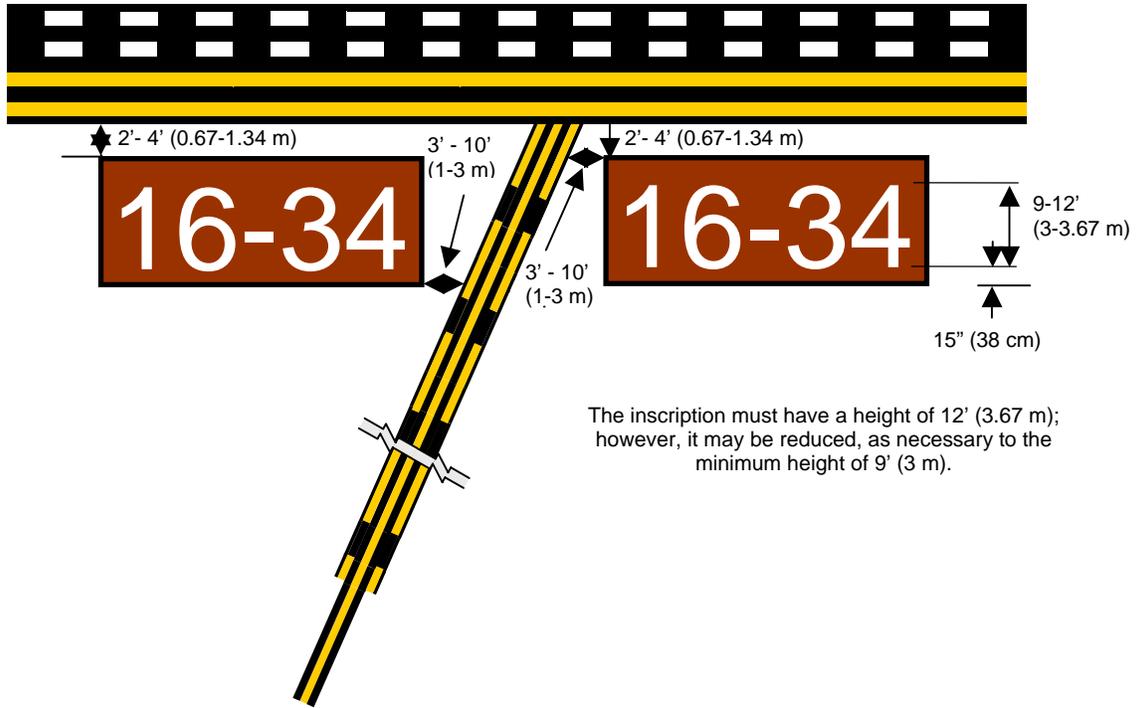
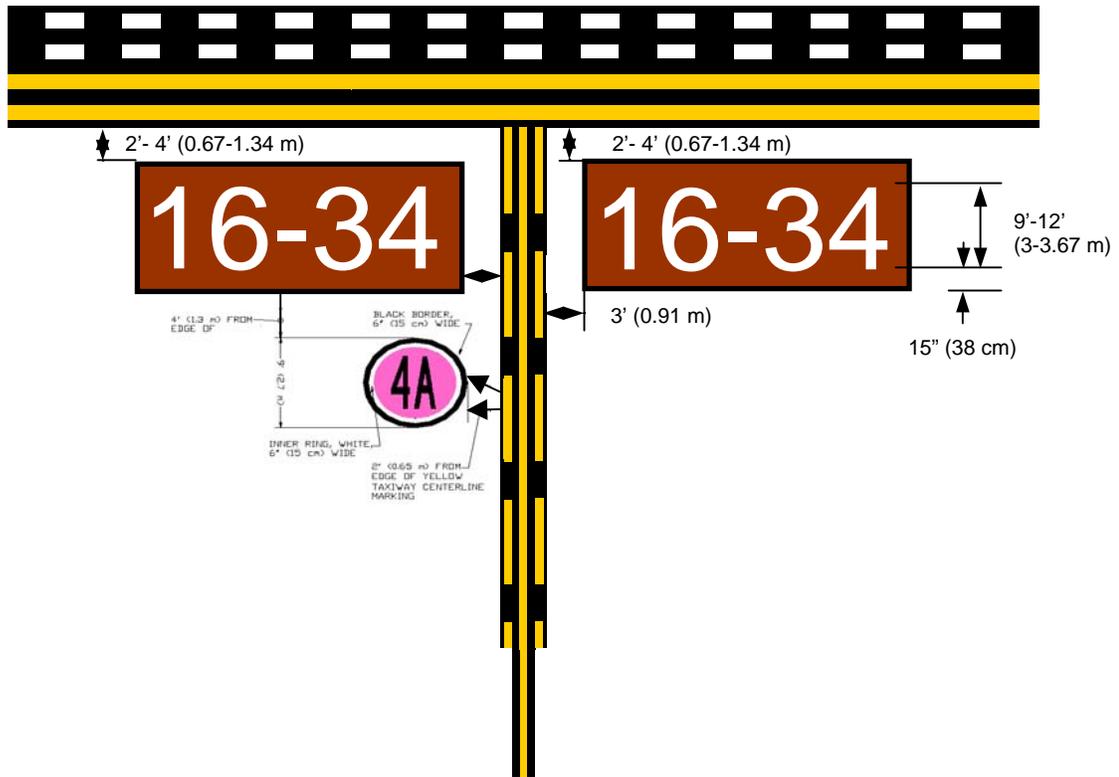


Figure C-4A. Surface Painted Holding Position Signs when Taxiway Centerline is not Perpendicular to Runway Holding Position Marking



Note: Because the geographic position marking cannot be located at a runway holding position for the low-visibility runway (see Paragraph 32(b)), this figure would apply only where the designated taxi route for low-visibility operations crosses a runway that is not itself the low-visibility runway.

Figure C-5. Surface Painted Holding Position Signs Co-Located with a Geographic Position Marking

6. GUIDELINES FOR APPLICATION. The following illustrations provide examples of various runway holding position locations using the enhanced markings. The figures included in this appendix are not drawn to scale.

a. Two Taxiway Centerlines Converging at a Runway Holding Position Marking. Where two taxiway centerlines converge at a runway holding position marking, the surface painted holding position signs must be installed parallel to the runway holding position marking. As shown in Figure C-6, only one sign on either side of the two taxiway centerlines is practical.

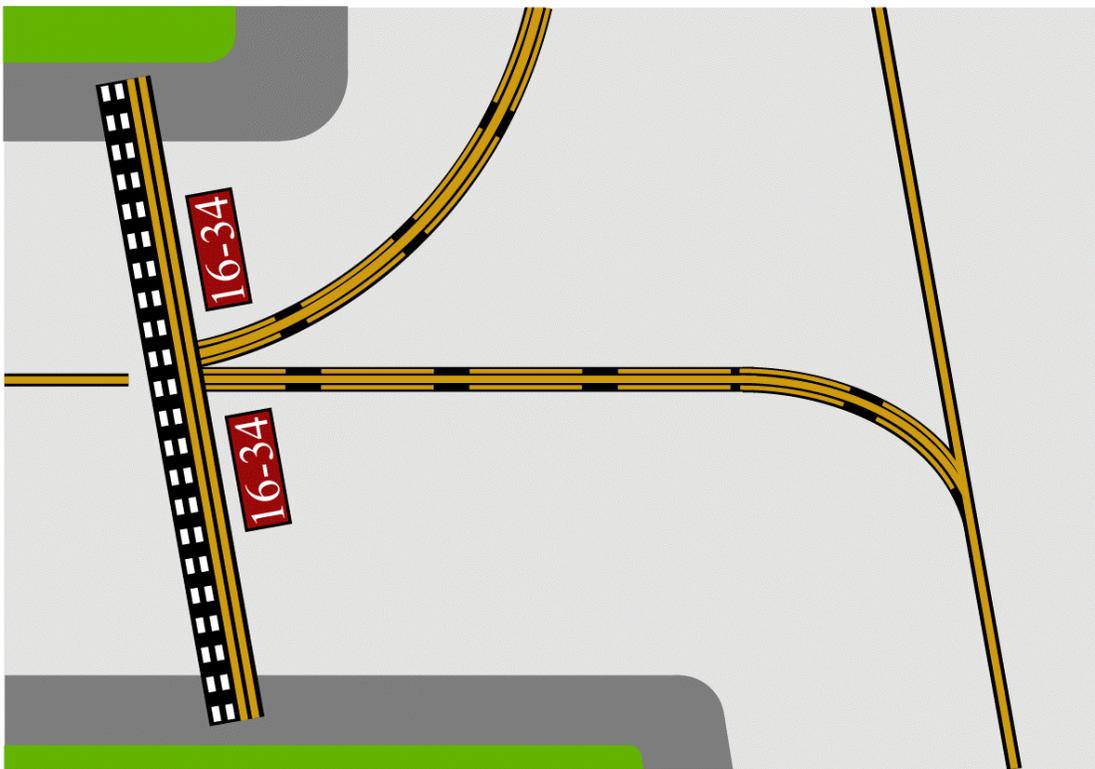


Figure C-6. Two Taxiway Centerlines Converging at a Runway Holding Position Marking

b. Intersection of Two Taxiways at Runway End. In the case of two converging taxiway centerlines, surface painted holding position signs containing a single runway designator must be positioned parallel to the runway holding position marking, as shown in Figure C-7.

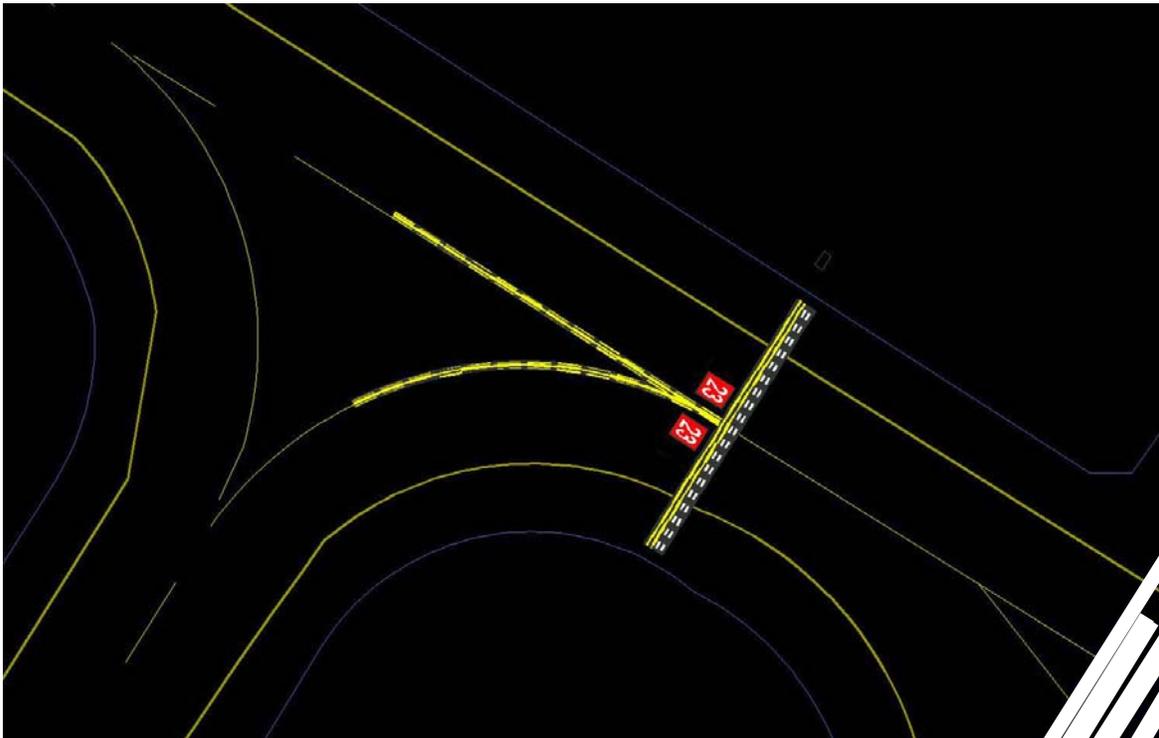


Figure C-7. Intersection of Two Taxiways at Runway End

c. Intersection of Three Converging Taxiway Centerlines. Figure C-8 illustrates taxiway centerline configurations when there are three converging centerlines.

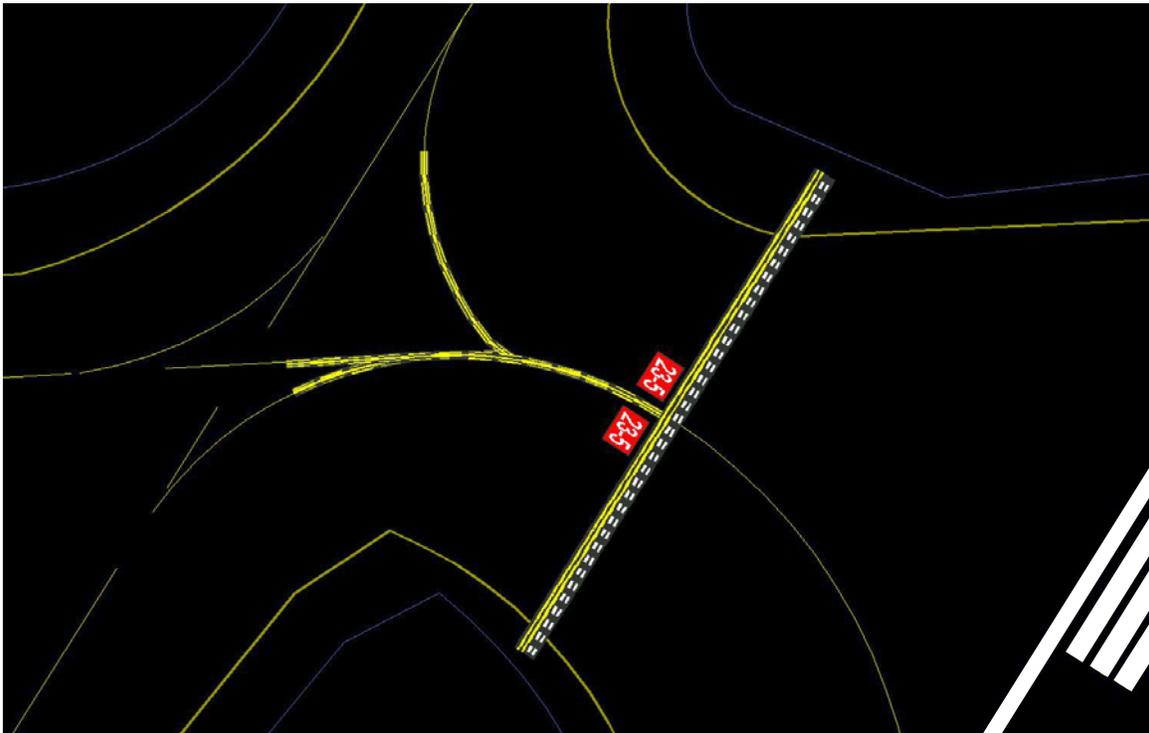
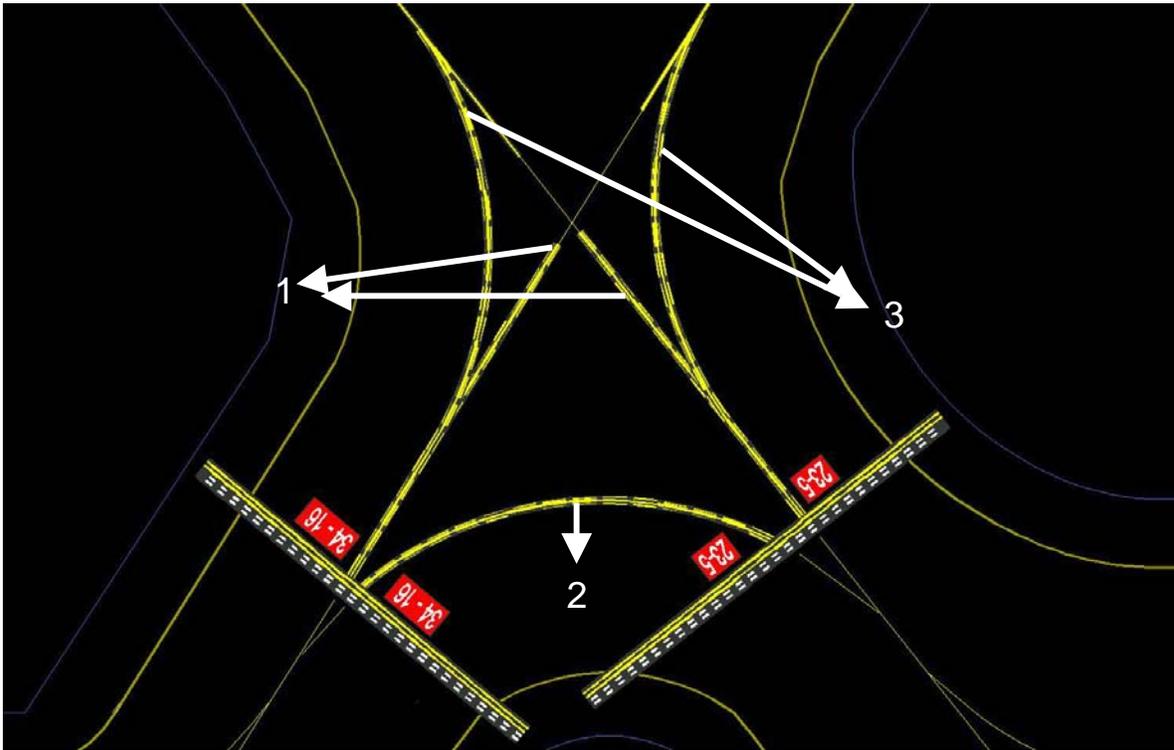


Figure C-8. Intersection of Three Converging Taxiway Centerlines

d. Intersection of Multi-Taxiway Centerlines with Less than 150 Feet (45.7 m) Between Taxiways. Figure C-9 illustrates different taxiway centerline configurations when there are three converging centerlines, less than 150 feet (45.7 m) between the runway holding position markings, and potential difficulty in positioning surface painted holding position signs in the available space.



Notes:

1. Illustrates perpendicular taxiway centerlines less than 150 feet (45.7 m) (see Appendix 3, Paragraph 3d.(1)).
2. Illustrates a curved taxiway centerline between two runway holding position markings with less than 150 feet (45.7 m) along the taxiway centerline (see Appendix 3, Paragraph 3b.(2)).
3. Illustrates two converging taxiway centerlines curving out to intersecting taxiway centerlines.

Figure C-9. Intersection of Multi-Taxiway Centerlines with Less than 150 Feet (45.7 m) Between Taxiways

f. Two Taxiway Centerlines Intersecting a Runway Holding Position Marking.
Figure C-10 illustrates an angled runway holding position marking that is intersected by two taxiway centerlines.

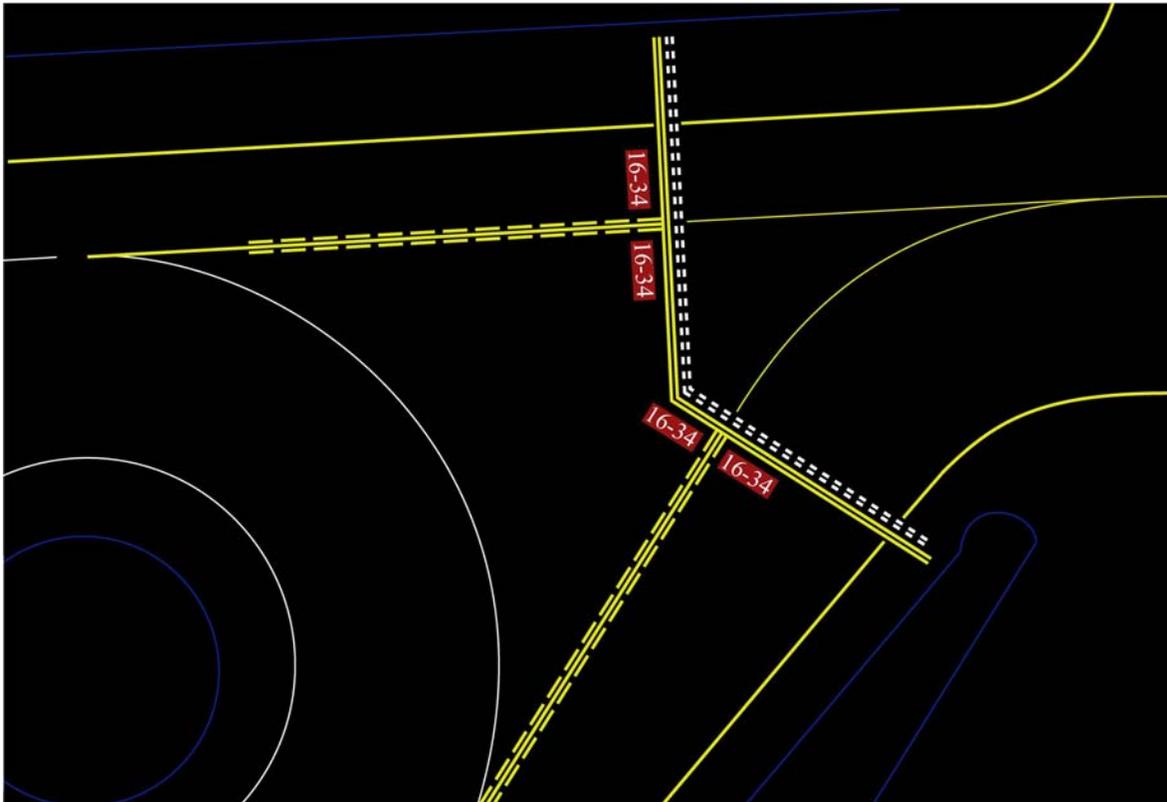


Figure C-10. Two Taxiway Centerlines Intersecting a Runway Holding Position Marking

g. Intersection of Stub Taxiway and Runway. Figure C-11 illustrates a solution for a stub taxiway that is less than 150 feet (45.7 m) long, with a 90-degree turn and angled taxiway shoulder areas.

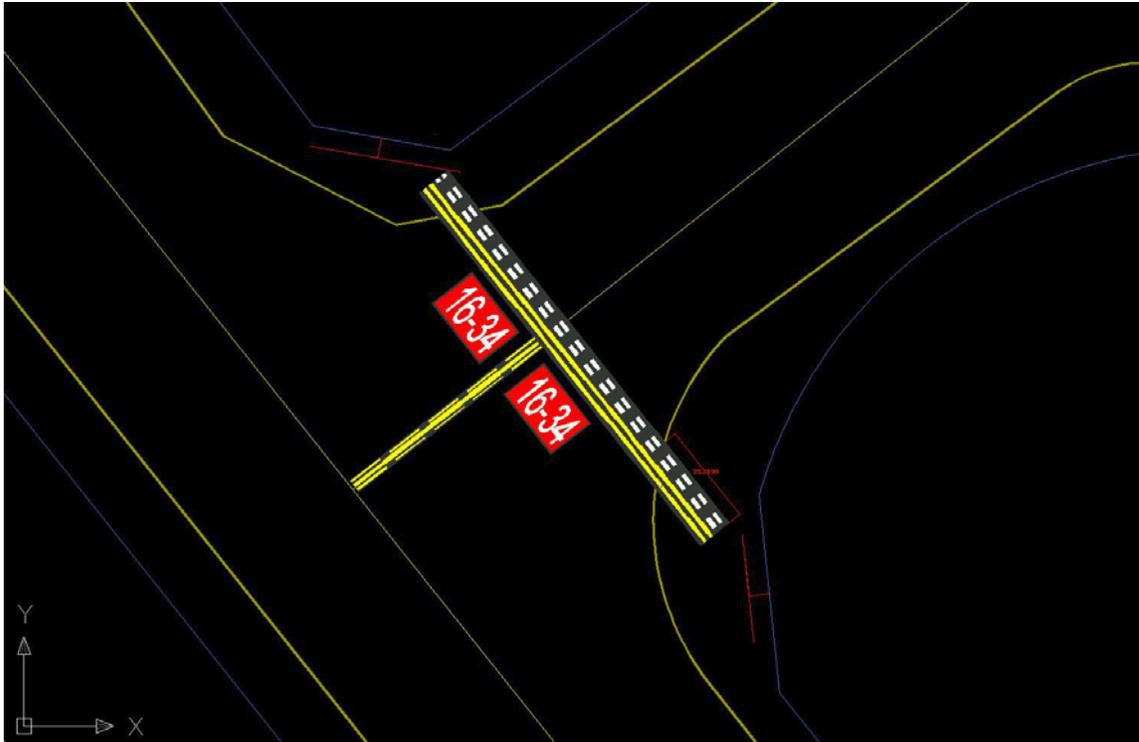


Figure C-11. Intersection of Stub Taxiway and Runway