



AC NO: 150/5340-1D

DATE: 19 Jan 73

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

SUBJECT: MARKING OF PAVED AREAS ON AIRPORTS

1. PURPOSE. This advisory circular describes standards for marking serviceable runways and taxiways as well as deceptive, closed, and hazardous areas on airports.
 2. CANCELLATION. Advisory Circular 150/5340-1C, Marking of Paved Areas on Airports, dated 3 November 1970, is cancelled.
 3. REFERENCES.
 - a. AC 120/29, Criteria for Approving Category I and Category II Landing Minima for FAR 121 Operators.
 - b. AC 150/5220-9, Aircraft Arresting Systems for Joint Civil/Military Airports.
 - c. AC 150/5300-8, Planning and Design Criteria for Metropolitan STOL Ports.
 - d. AC 150/5325-6A, Effects and Treatment of Jet Blast.
 - e. AC 150/5335-1A, Airport Design Standards - Airports Served by Air Carriers - Taxiways.
 - f. AC 150/5340-5A, Segmented Circle Airport Marker System.
 - g. AC 150/5340-18, Taxiway Guidance Sign System.
 - h. AC 150/5345-2, Specification for L-810 Obstruction Light.
 - i. AC 150/5390-1A, Heliport Design Guide. (\$0.75)
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Initiated by: AAS-550

4. EXPLANATION OF REVISIONS. This specification revises the position of the taxiway holding line, allows use of touchdown zone marking on one end of the runway and makes editorial changes.
5. APPLICATION. Apply these standards and practices whenever an operational need exists for marking runways and taxiways or deceptive, closed, or hazardous areas on an airport. Initial marking should be accomplished as soon as possible. Revision to existing marking, such as the touchdown zone, should be accomplished when remarking is necessary. The effectiveness of markings is heavily dependent upon their proper maintenance to provide maximum contrast with background. Standards for marking arresting barrier pendant cable, heliports, and STOL ports appear in circulars covering these facilities.
6. RUNWAY MARKING. In the interest of safety, regularity, and efficiency of aircraft operation, apply the following requirements.
 - a. Runway Marking Requirements. Runway markings, divided into the three phases with minimum elements specified for each phase, shall be in accordance with the requirements set forth below. Configurations complying with the standards are detailed in Figures 1 and 2.
 - (1) Basic Runway Marking. Mark the runway used for operations under VFR and circling instrument procedures as follows:
 - (a) Centerline marking and runway designation marking (and letters if required).
 - (b) Threshold marking at those airports used or intended to be used as regulars or alternates by international air services.
 - (c) The additional elements of the nonprecision instrument runway and precision instrument runway marking patterns outlined below may be added where needed from an operational standpoint.
 - (2) Nonprecision Instrument Runway Marking. A nonprecision instrument runway is one to which a straight-in nonprecision approach has been approved. Mark these runways as follows:
 - (a) Basic runway markings plus threshold marking.
 - (b) The additional elements of the precision instrument pattern outlined below may be added where needed from an operational standpoint.

- (3) Precision Instrument Runway Marking. A precision instrument runway is one equipped with electronic aids (such as ILS or PSR) which support a precision approach. Mark these runways and those having special operational requirements as follows:
 - (a) Nonprecision instrument runway marking.
 - (b) Touchdown zone markings.
 - (c) Side stripes.
- b. Precedence of Runway Markings. At the intersection of runways, display the runway marking of highest precedence and interrupt the other runway markings. The following is the order of precedence:
 - (1) Precision instrument runway marking.
 - (a) Category II.
 - (b) Category I.
 - (2) Nonprecision instrument runway marking.
 - (3) Basic runway marking.
- c. Runway Centerline Marking. Mark the runway centerline with a broken line having 120-foot dashes and 80-foot blank spaces. The minimum width of the basic runway centerline mark is one foot. The minimum width of the nonprecision instrument runway centerline marking and the precision instrument runway centerline marking is three feet.
- d. Runway Designation Marking. Designate each runway end by numbers assigned and by letters, where required. Assign numbers and letters from the approach direction and conform to the form and dimension shown in Figure 2. The number assigned shall be the whole number nearest $1/10$ the magnetic azimuth of the centerline of the runway measured clockwise from the magnetic north. Where four or five parallel runways are considered, two of the runways shall be assigned numbers of the next nearest $1/10$ the magnetic azimuth. Single digits shall not be preceded by a zero.
 - (1) Parallel Runways. The letter or letters, where required, to differentiate between parallel runways are as follows, in the order shown from left to right:
 - (a) For two parallel runways "L", "R".
 - (b) For three parallel runways "L", "C", "R".

- (c) For four parallel runways, one adjacent pair shall be numbered as in (a) above, and the remaining adjacent pair shall be numbered the next nearest 1/10 the magnetic azimuth with letters "L", "R".
 - (d) For five parallel runways, three adjacent runways shall be numbered as in (b) above, and the remaining two adjacent runways shall be numbered the next nearest 1/10 the magnetic azimuth with the letters "L", "R".
 - (e) For six parallel runways, three shall be numbered as in (b) above, and the remaining three numbered to the next nearest 1/10 magnetic azimuth with the letters "L", "C", "R".
- (2) Intersection of Runway Ends. In locating the marking where runways have a common intersection, give preference to the most important runway.
- (3) Reduction in Width. Use a proportional reduction of the width and transverse spacing of numbers (shown in Figure 2) up to 50 percent for runway designation markers for runways which are less than 75 feet in width.
- e. Runway Threshold Marking. The threshold marking, with outer dimension of 150 by 130 feet, shall consist of eight stripes, each 12 feet wide and 150 feet long. Separate the stripes by spaces three feet wide, except that the center space shall be 16 feet. For a runway less than 150 feet wide, the length of the threshold marking shall remain at 150 feet, but the overall width of the marking shall be the runway width less 20 feet, and the width of the stripes and the distance between the stripes shall be reduced proportionally to the reduction in overall width of the threshold marking. For a runway greater than 150 feet in width, apply the 150 by 130 feet marking and add additional threshold marking stripes as space permits.
- f. Runway Side Stripes. Apply runway side stripes as shown in Figure 2. These stripes are continuous lines and are a minimum width of three feet wide for precision instrument runways and the same width as the centerline stripe on other runways. These side stripes shall be applied so that all pavement covered and between the side stripes is full strength. The maximum distance between the inside edges of side stripes shall be 194 feet.

- g. Runway Touchdown Zone Marking. The runway touchdown zone marking shall be installed at both ends of precision instrument runways except where there is little expectation that one end will qualify for precision approaches. In this case, the touchdown zone marking may be omitted from that end. Fixed distance markers will be installed at both ends of the runway if that runway serves turbojet aircraft. For operations not involving turbojet aircraft, the fixed distance marking may be omitted leaving three stripes at the 1,000-foot point. For shorter runways, any pair of markings that would extend to within 1,000 feet of the midpoint of the runway is subject to elimination (elimination will be made on an individual basis). For runways less than 150 feet in width, reduce the width of the markings and spacing proportionately to the width of the runway to 150 feet.
- h. Runway Fixed Distance Marking. Provide fixed distance marking for all runways 4,000 feet or longer used for turbojet operations. This marking shall be 30 feet wide by 150 feet long and located 1,000 feet from the threshold marker as shown in Figure 1. For runways less than 150 feet in width, reduce the width of the marking proportionately to the width of the runway to 150 feet.
- i. Runway Displaced Threshold. Mark displaced thresholds as shown in Figure 3 where the paved area on the approach to the displaced threshold is full strength and can be used for taxiing and takeoff of aircraft. Mark the paved area as shown in Figure 5 on the approach to the threshold where this area is not full strength and cannot be used for landing, takeoff, or taxiing. Temporarily displaced thresholds may be marked with a material of a nonpermanent nature which will not pose a threat of damage to aircraft.
- j. Striated Marking. Except on Category II runways, in locations subject to frost heave, runway markings three feet wide and over may consist of a series of longitudinal stripes from four to six inches wide with equal distance between stripes. This striping method reduces possible frost heave to pavement and increases the coefficient of friction over the painted areas. This increased friction may make this striping desirable in other than frost areas. However, the striped paint area must be kept in a fresher condition than a solid area since contrast is reduced in proportion to the reduction in the painted areas. Where striated marking is used, the overall mark may be increased by up to six inches and the spacing between marks (such as touchdown zone and threshold marks) decreased a like amount. See Figure 2.

7. TAXIWAY MARKING. Mark taxiways in accordance with the following standards and as shown in Figure 2.

- a. Taxiway Centerline Marking. Mark each taxiway with a single continuous stripe along the centerline. Make the stripe a minimum of six inches wide.
- (1) At taxiway intersections with runway ends, terminate taxiway stripes in line with the nearest edge of the runway.
 - (2) At intersections of taxiways with runway, where the taxiway may serve as a normal exit from the runway, except as provided in paragraph 7a(1), curve the centerline marking into the extended runway centerline marking as shown in Figure 2. Extend this marking parallel to the runway centerline marking for a distance of 200 feet beyond the point of tangency. Draw the curve of this taxiway turnoff tangent to a line parallel to and three feet from the near side of the runway centerline marking and tangent to the taxiway centerline. Make the curve the largest radius curvature which will retain a clearance to the taxiway or runway edge of not less than $1/2$ the width of the taxiway.
 - (3) When a taxiway crosses a runway, the taxiway centerline marking may continue across the runway, but it must be interrupted for the runway markings.
 - (4) At taxiway intersections, the taxiway centerline markings shall intersect.
- b. Taxiway Edge Marking. Where the edge of the full strength pavement of a taxiway is not readily apparent, mark this edge with two parallel six-inch stripes separated by six inches, as shown in Figure 2, View D.
- c. Taxiway Holding Line Marking. The taxiway holding line is located at the following distances from the structural pavement edge of a runway: (1) 50 feet on utility runways; (2) on other runways, 100 feet except for runways serving heavy jet aircraft where a minimum of 150 feet is required. Where used, locate the taxiway holding line on taxiway intersections a minimum of 100 feet from the structural pavement edge. Increase this distance if needed to obtain adequate structural or blast clearance. When the taxiway is associated with a holding bay, the marking may be parallel to the

centerline of the runway or intersecting taxiway. Details of the taxiway holding line marking are shown in Figure 2.

- d. ILS Critical Area Marking. The ILS critical areas are shown in Figure 4. The glide slope areas must be marked for protection for Category I and Category II installations. Mark the critical area for a Category I glide slope with a taxiway holding line marking. On Category II airports, apply the Category II hold line marking to indicate the critical areas (glide slope, localizer and obstruction clearance) shown in Figure 4. Hold lines shall not be installed across usable runways. Use Category II hold mark when it and the taxiway holding line marking are indicated for the same point. Where a Category II hold line exceeds 200 feet in length, mark the term "CAT II" in six-foot block letters above the hold line at intervals not to exceed 150 feet.
 - e. Taxiway Identification. Taxiway designation is covered in Advisory Circular 150/5340-18, Taxiway Guidance Sign System. Where difficulty is encountered in locating signs to identify taxiways, mark the designation letter on the pavement near the centerline in six-foot block letters. Use arrows near the edge of a taxiway at intersections to identify the intersecting runway or taxiway. See Figure 7.
8. MARKING AND LIGHTING OF CLOSED, DECEPTIVE, AND HAZARDOUS AREAS ON AIRPORTS. Apply the following standards when there is a closed or hazardous area on the airport or when a deceptive area exists and the airport authority determines that an operational need exists to mark the same.
- a. Closed Airports. When the entire landing area is rendered unsafe by a hazardous condition, declare the field closed and mark as follows:
 - (1) Day Marking. Mark the runways closed as described in paragraph 8b; and at airports having the segmented circle marker (in accordance with Advisory Circular 150/5340-5A, Segmented Circle Airport Marker System), place the cross indicating a closed field in the circle. At other airports, place a cross at a central location readily visible from the air. Make all crosses in accordance with Figure 6.
 - (2) Night Marking. Disconnect controls to runway, boundary, and landing direction indicator lights. Place lanterns or flare pots so as to outline the centrally located cross. Permit the beacon to remain in operation unless the airport is to be closed permanently, in which case, the appropriate FAA Regional Director should be notified BEFORE extinguishing the beacon.

b. Closed Runways and Taxiways. Use crosses for marking closed runways and taxiways. See Figure 6 for dimensions of the crosses.

- (1) Permanently Closed Runways and Taxiways. When runways and/or taxiways have been permanently closed to aircraft traffic, obliterate all markings indicating usable runway or taxiway and disconnect the lighting circuits. Place crosses near the ends and at 1,000-foot intervals on each closed runway or taxiway. When a closed runway or taxiway is intersected by a usable runway or taxiway, place crosses on the closed surface on each side of the usable surface.
- (2) Temporarily Closed Runway and Taxiway. Mark runways and taxiways which are temporarily closed with crosses of the same size and color as those used to mark permanently closed areas. Construct the crosses of any suitable material such as: fabric, plywood, or similar material. Secure the crosses in place in a suitable manner. To denote a temporarily closed runway, position the crosses above the runway numerals.

c. Hazardous and Unserviceable Parts of the Movement Areas.

- (1) Where a relatively small paved area has failed or for any other reason becomes hazardous for aircraft operation and it is not intended to close the entire area to operations, use red flags not less than 20 inches square for day marking and use red lights for night marking to delineate the hazardous area. When flags are made of fabric, use a wire stiffener to hold the flag in an extended position. Mount flags and lights so they are not a hazard and sufficiently close together to clearly delineate the area.
- (2) Where large apron areas are unserviceable, place a cross (as shown in Figure 6) in the center of the unserviceable area. If this type movement area is used at night, place red lights to delineate the unserviceable parts of the area.
- (3) On runways or taxiways where the unserviceable area is such as to render the runway or taxiway or portion thereof unusable, place red lights at the entrance to such areas and disconnect controls to the runway or taxiway lights in the section rendered unusable.
- (4) Use steady burning red lights of at least 10 candelas or flashing red lights of at least five candelas effective intensity for night marking of unserviceable parts of the

movement areas. Red lights with a light distribution equivalent to a fixture meeting the requirements in Advisory Circular 150/5345-2, Specification for L-810 Obstruction Light, are acceptable.

- (5) Aircraft may be excluded from hazardous or unserviceable areas by the use of substantial timber (12 inches by 12 inches) barricades painted alternating white and orange. Flags and lights may be added to increase the conspicuity.
 - d. Stabilized Areas. Holding bays, aprons, and taxiways are sometimes provided with shoulder stabilization to prevent blast and water erosion. This stabilization may have the appearance of full strength pavement but is not intended for roll-over by aircraft. Usually, the taxiway edge marking will define this area, but conditions may exist such as stabilized "islands" or taxiway curves for use by long bodied aircraft where confusion may exist as to which side of the side stripe the full strength pavement is located. Where such a condition exists, mark the stabilized areas with three-foot stripes perpendicular to the edge stripes. On curves, place a mark at each point of tangency and place intermediate marks a maximum of 50 feet apart. Mark straight portions with a maximum of 100-foot spacing. Extend these stripes to five feet from the edge of the stabilized area or 25 feet long, whichever is less.
 - e. Runway Shoulders. Usually the runway side stripes will indicate the edge of the full strength pavement. However, conditions may exist, such as exceptionally wide runways, where a need exists to indicate the area not intended for use by aircraft. In such cases, chevrons (as indicated in Figure 8) may be applied.
 - f. Notification. Immediately report closed runways and taxiways, airport hazardous areas, and closed airports, as described in paragraphs 8a, 8b, and 8c above, to the appropriate Flight Service Station or other FAA offices for NOTAM promulgation, as required, and for transmission to the National Flight Data Center (Attention: AAT-435) for appropriate action.
9. GENERAL.
- a. Color. Use the following color for marking.
 - (1) White for all runway markings except for marking indicating deceptive, closed, or hazardous areas.

- (2) Aviation yellow for all taxiway marking and all deceptive, closed, and hazardous area markings.
- (3) On pavement of light color, markings may be outlined in black at least six inches wide to increase their conspicuity.

b. Definitions. With respect to this standard, apply the following definitions.

- (1) Threshold. The line established by competent authority perpendicular to the runway centerline designating the beginning of that portion of a runway usable for landing.
- (2) Displaced Threshold. A threshold that is not at the beginning of the runway pavement.

c. Markers and Marking for Snow-Covered Runways. Use markers and markings to indicate the usable limits of snow-covered runways. Place markers along the sides of the usable portion of snow-covered runways, spaced at intervals of not more than 330 feet, and located symmetrically about the axis of the runway. Place sufficient markers to indicate the runway threshold.

- (1) Characteristics. Markers for snow-covered runways shall consist of conspicuous objects such as spruce trees about five feet high, set upright on light wooden tripods.
- (2) Markings. Mark with dye or other suitable materials runways to be used while covered with snow. Apply centerline and threshold marking, as well as side stripes when required. Details specified for regular marking may be varied to accomplish the purpose intended.

10. HOW TO OBTAIN THIS PUBLICATION AND THE REFERENCED CIRCULARS.

- a. Obtain additional copies of this circular, Advisory Circular 150/5340-1D, Marking of Paved Areas on Airports, and the referenced circulars free of charge from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.

- b. Obtain Advisory Circular 150/5390-1A, Heliport Design Guide, from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, for \$0.75. Make check or money order payable to the Superintendent of Documents. No c.o.d. orders acceptable.



CLYDE W. PACE, Jr.
Director, Airports Service

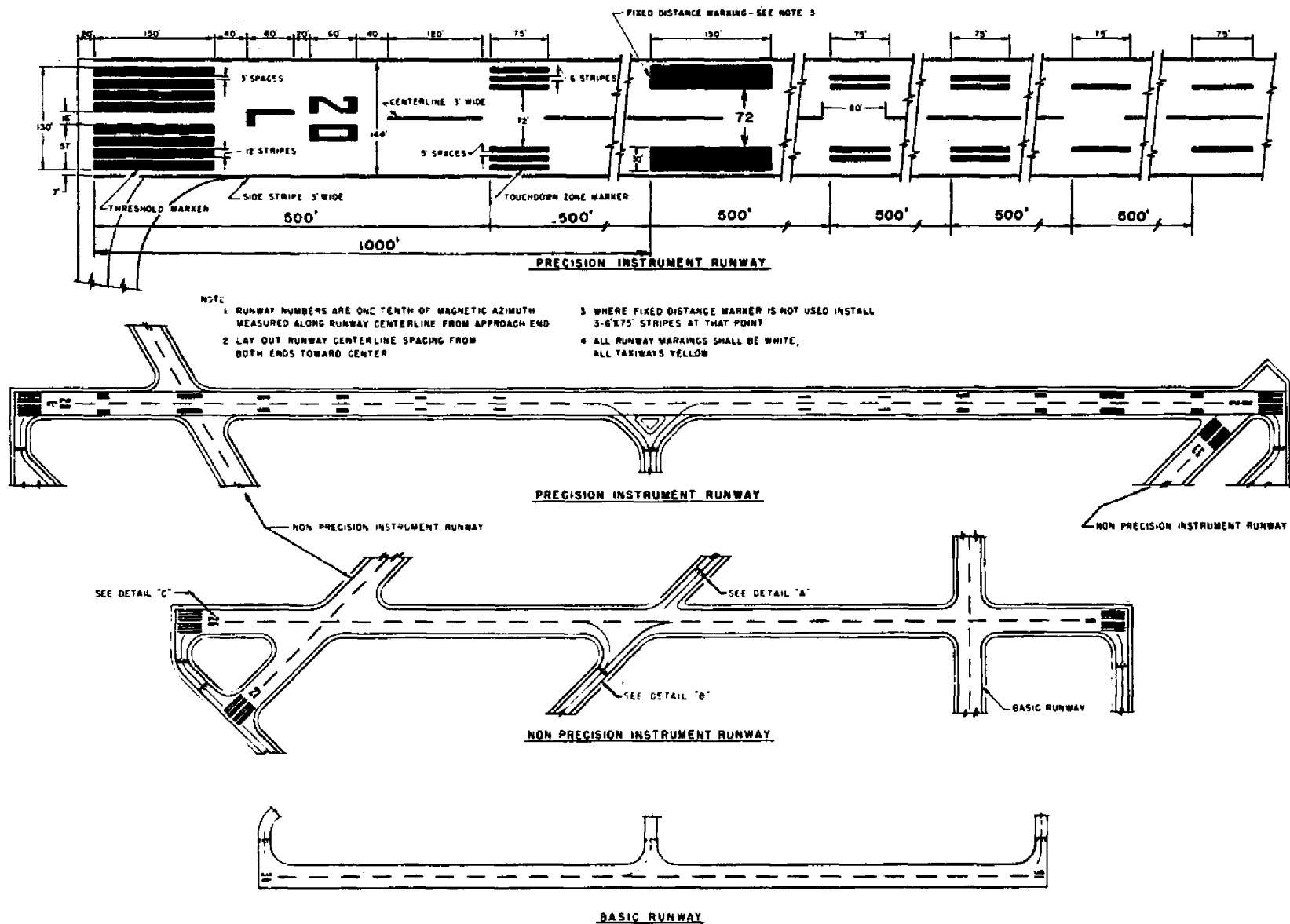
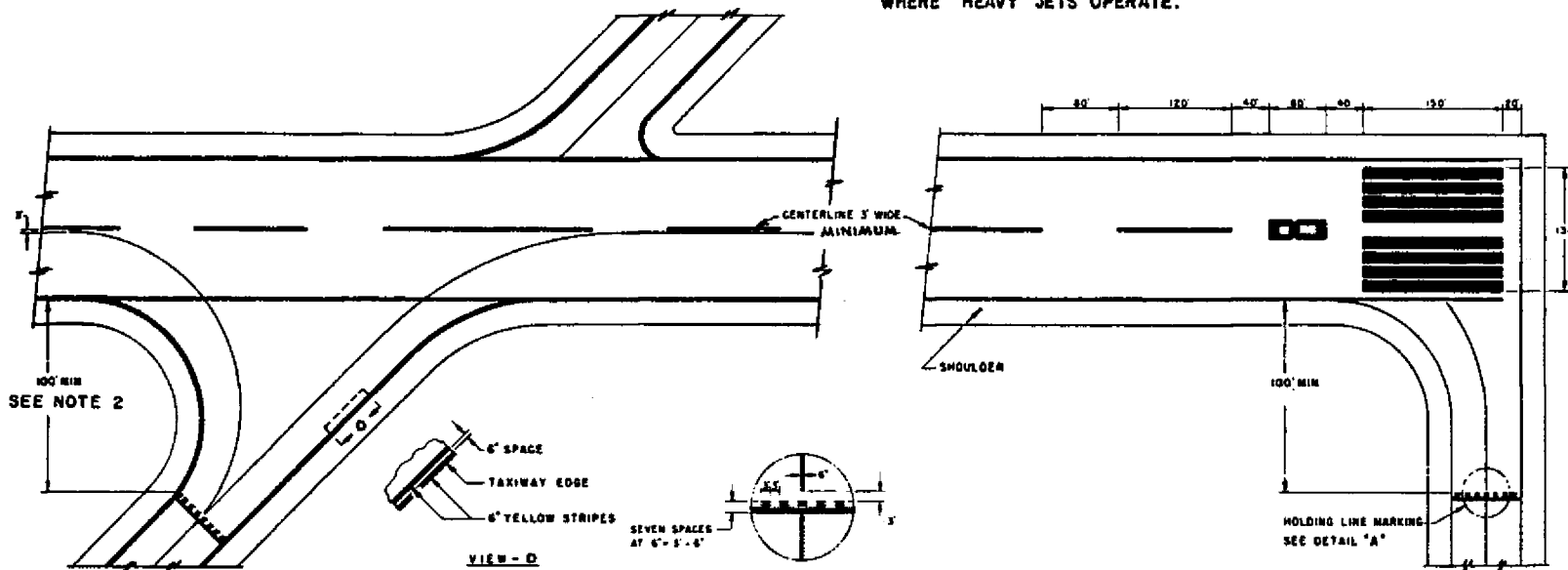


FIGURE 1. TYPICAL RUNWAY MARKING

NOTES:

1. LAY OUT ALL RUNWAY CENTERLINE SPACING FROM BOTH ENDS TOWARD CENTER.

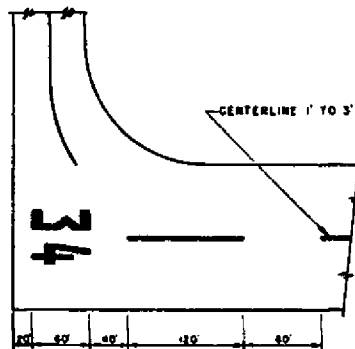
2. LOCATE HOLDING LINE 100' FROM EDGE OF RUNWAY OR 150' FROM EDGE OF RUNWAYS WHERE "HEAVY" JETS OPERATE.



**TAXIWAY CENTERLINE
DETAIL "B"**

DETAIL "A"

NON PRECISION INSTRUMENT RUNWAY

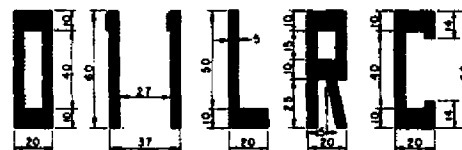


BASIC RUNWAY

NOTE
1 ALL STRIPES AND SPACES TO BE EQUAL WIDTH.
2 MAXIMUM WIDTH 6 INCHES
MINIMUM WIDTH 4 INCHES



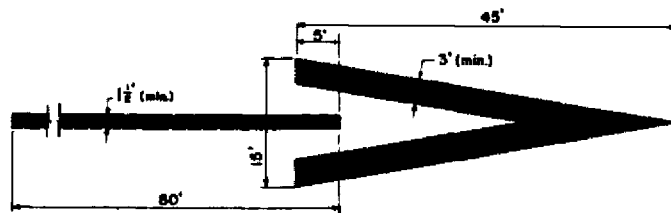
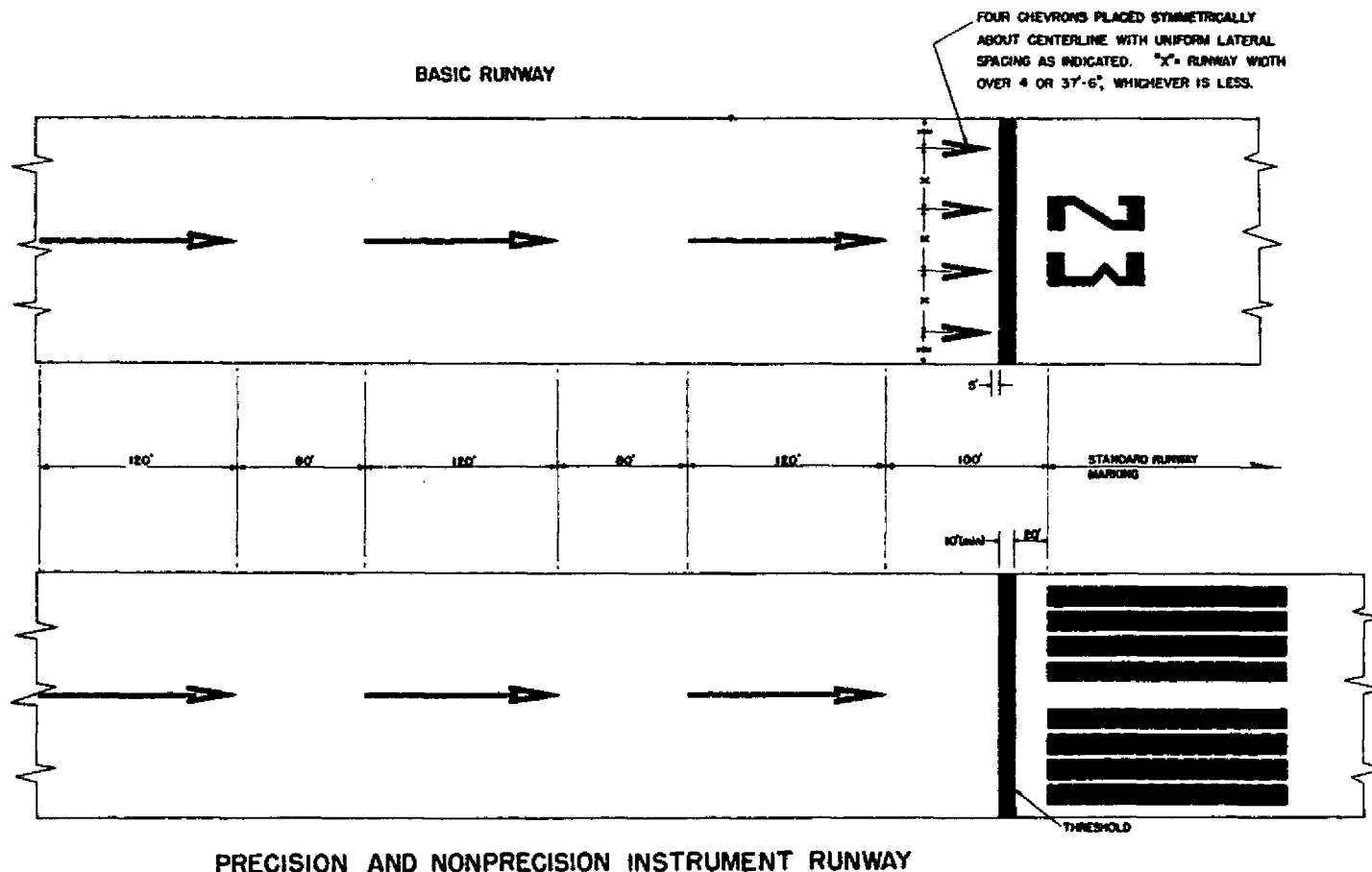
**THRESHOLD MARKER STRIPE
FROST AREA MARKING**



NOTE
1 ALL NUMERALS AND LETTERS SHALL BE HORIZONTALLY SPACED 15 FEET APART, EXCEPT THE NUMERALS IN NUMBER ELEVEN AS SHOWN
2 WORK TO DIMENSIONS, DO NOT SCALE
3 ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN FEET AND INCHES

**NUMERALS AND LETTERS
DETAIL "C"**

FIGURE 2. MARKING AND TAXIWAY TYPICAL MARKING DETAILS



CHEVRON AND ARROW DETAIL

NOTE:

1. FOR RUNWAYS LESS THAN 75' WIDE REDUCE DIMENSIONS PROPORTIONATELY.
2. COLOR CHEVRONS WHITE AND ARROWS YELLOW.

FIGURE 3. DISPLACED THRESHOLD MARKING

1. Location of hold lines when operations are permitted on a 400' parallel taxiway.
2. Or to the end of the runway, whichever is greater.
3. Where Category II hold line is more than 200' long, mark the pavement CAT II on the runway side as shown at 150' intervals.

FIGURE 4. ILS CRITICAL AREAS AND MARKING

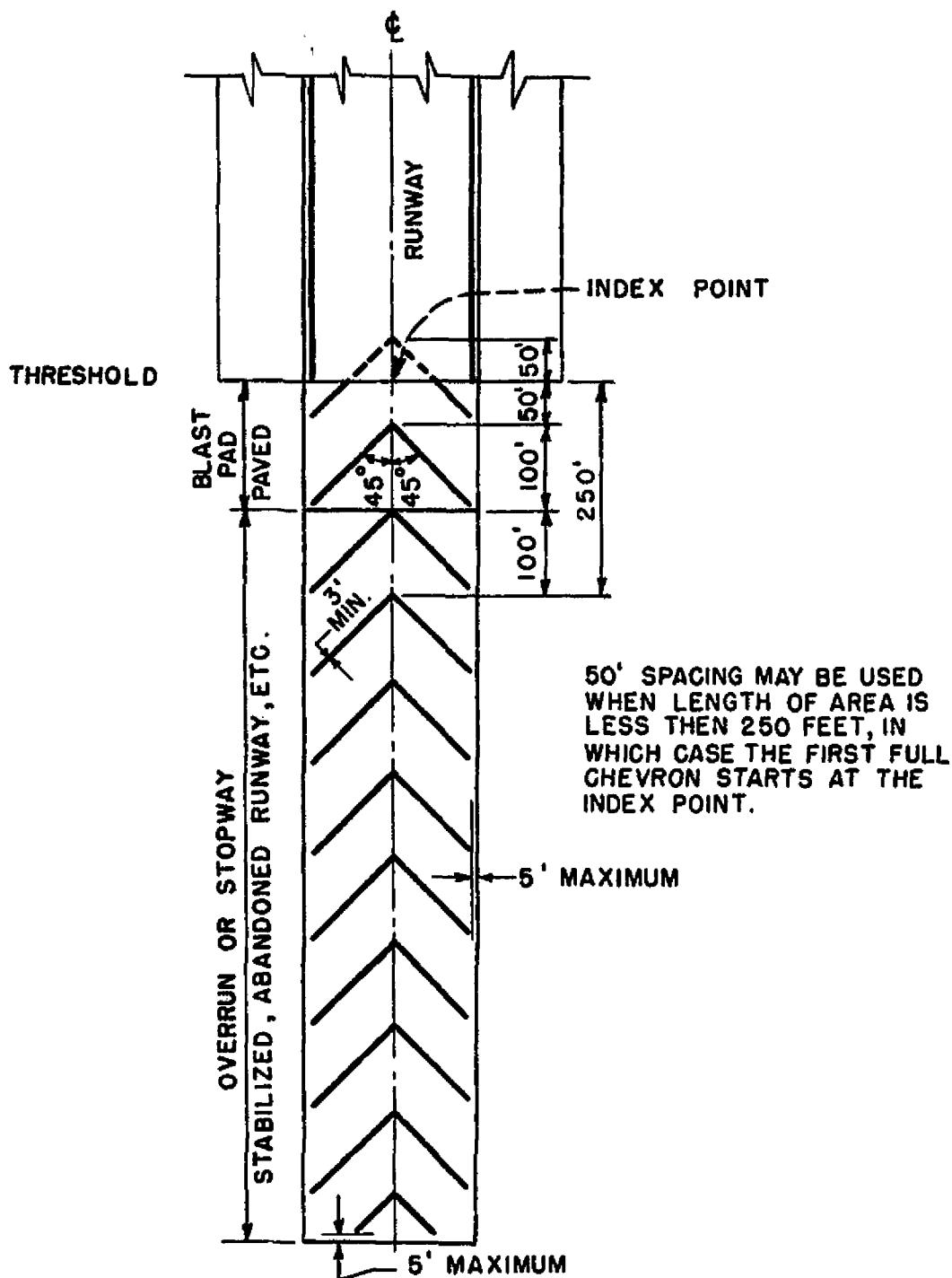


FIGURE 5. CHEVRON POSITION ON BLAST PADS, OVERRUN, OR STOPOVER AREAS

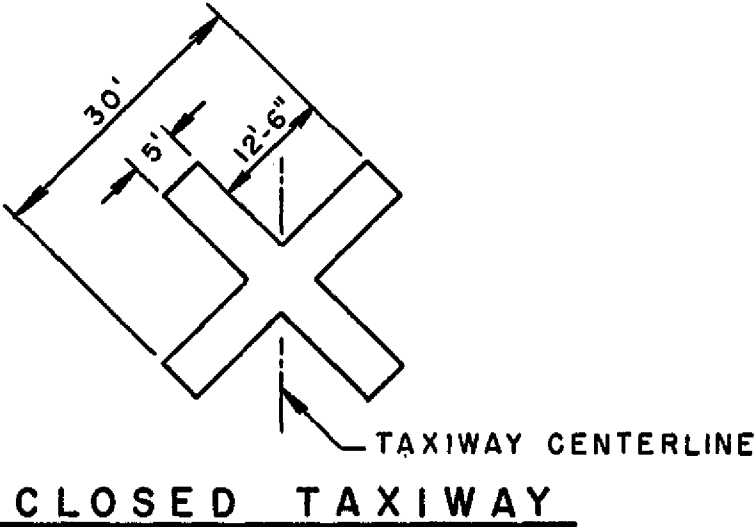
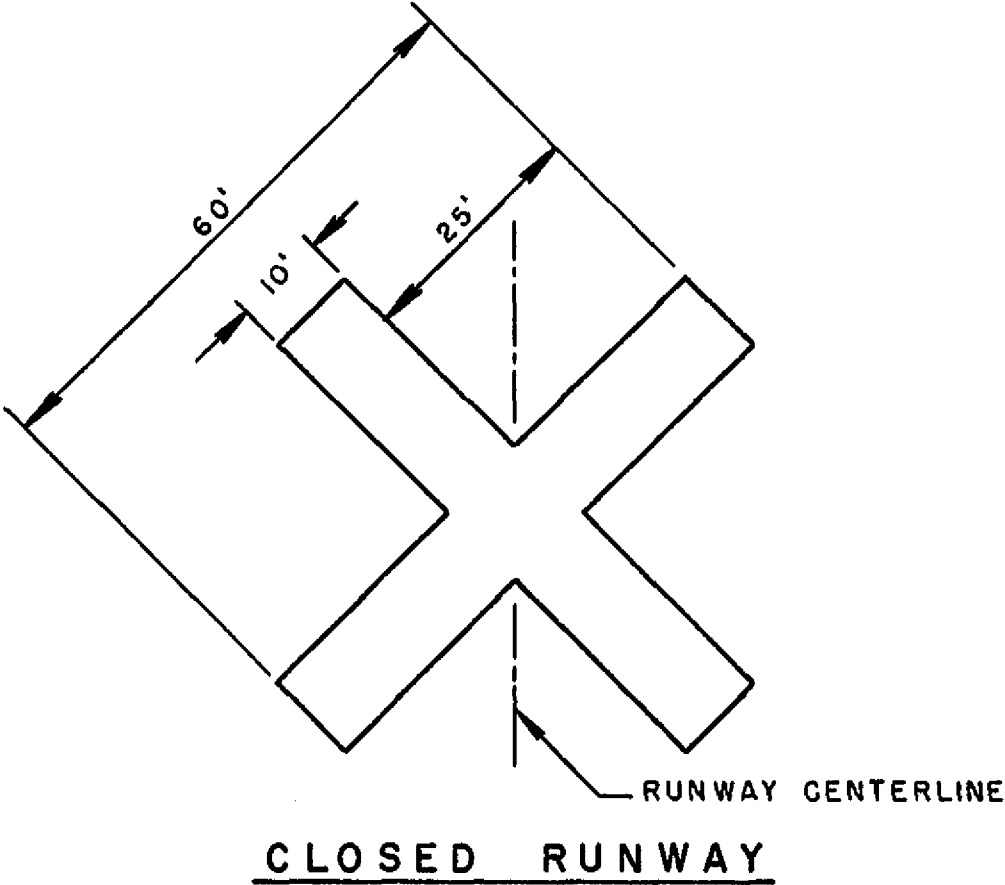


FIGURE 6. CROSS FOR CLOSED RUNWAY AND TAXIWAY

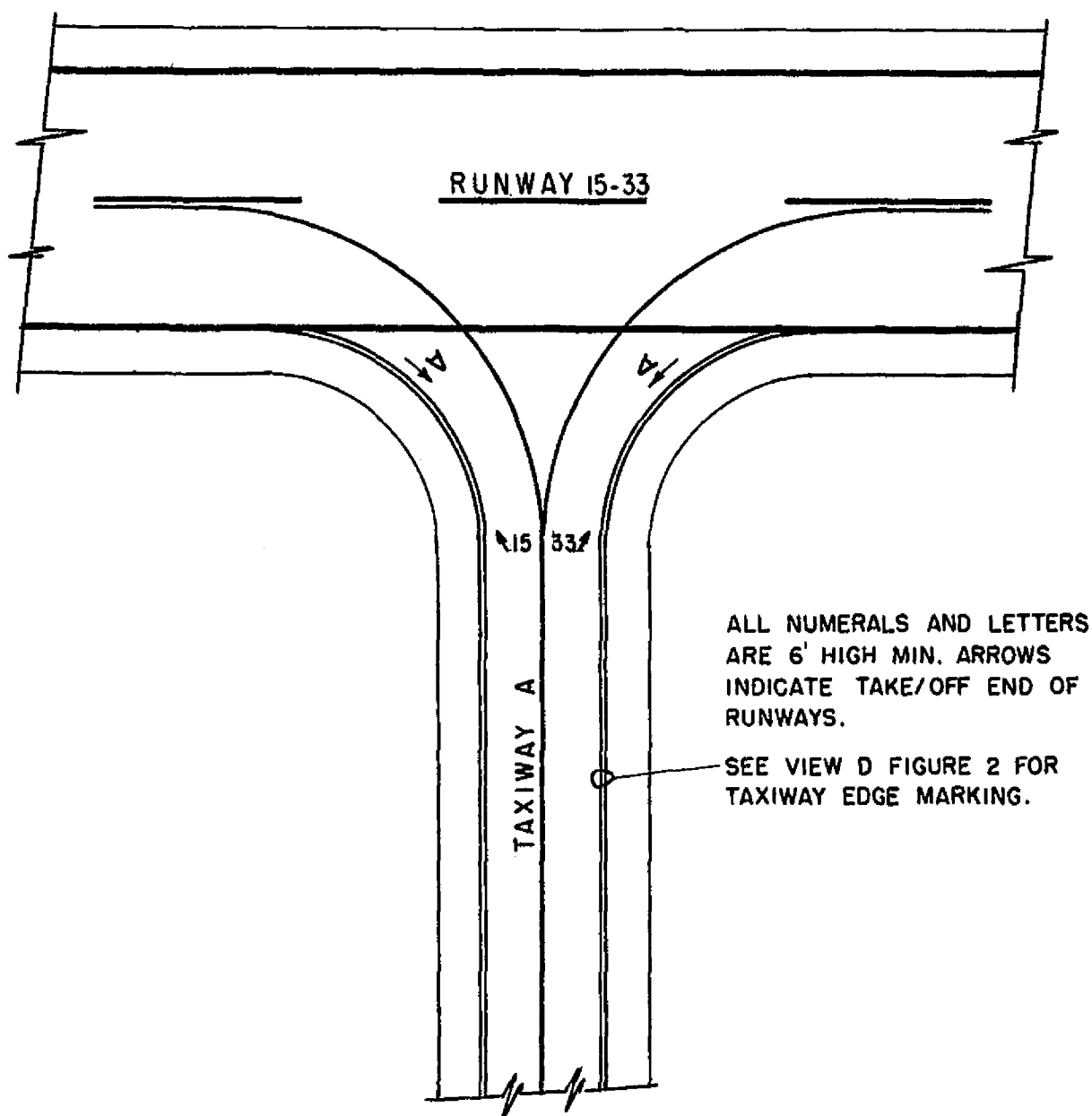


FIGURE 7. TAXIWAY IDENTIFICATION MARKING

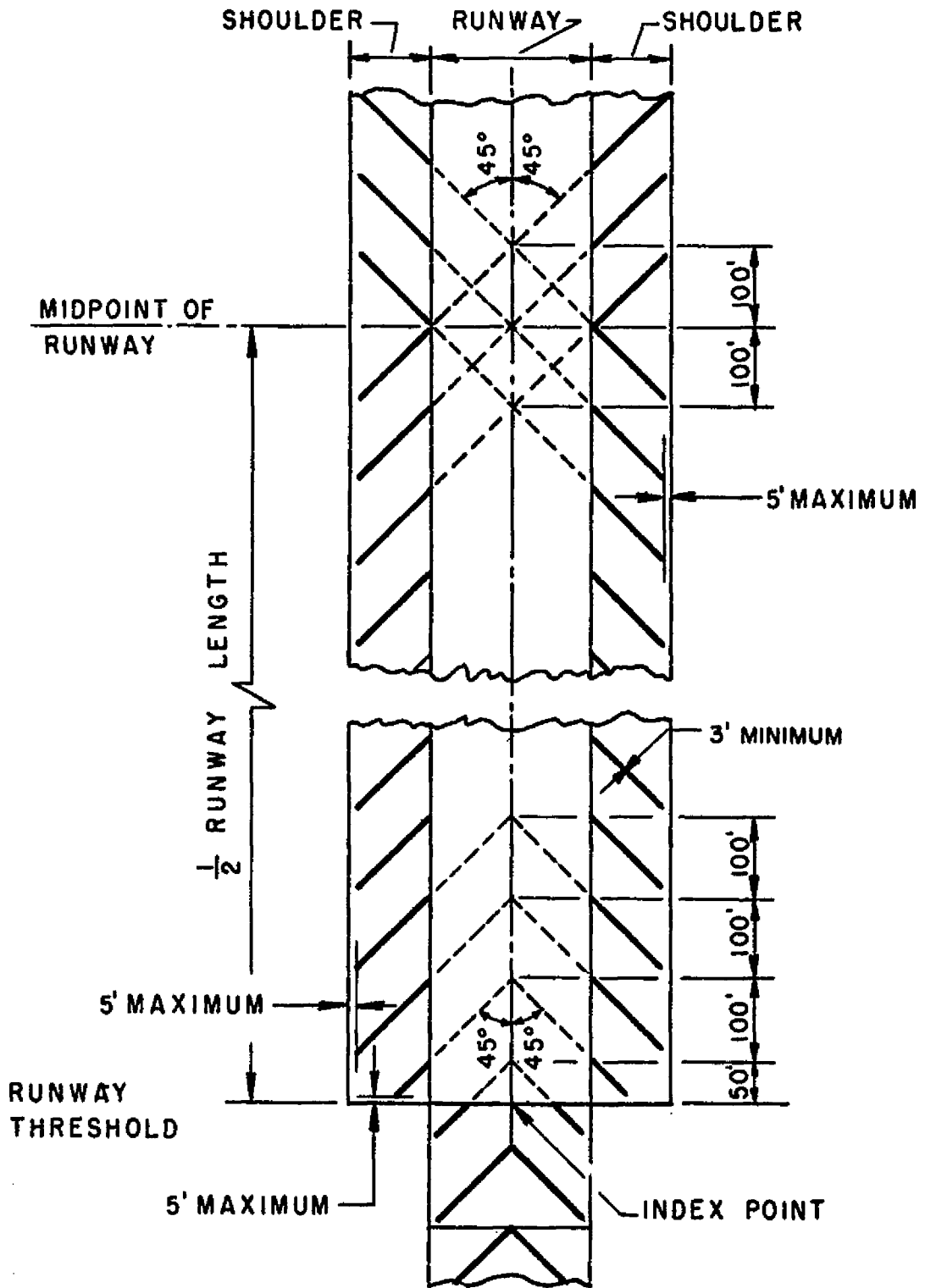


FIGURE 8. RUNWAY SHOULDER MARKING