

HQ - 630

AC NO: AC 150/5340-18

DATE: 9/27/68



ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

SUBJECT: TAXIWAY GUIDANCE SIGN SYSTEM

1. PURPOSE. This advisory circular describes the recommended standards for design, installation, and maintenance of a taxiway guidance sign system.
2. CANCELLATION. This publication cancels Technical Standard Order N23, Taxiway Sign System, dated March 24, 1953.
3. REFERENCES. Technical publications listed under Appendix 1, Bibliography, provide further guidance and detailed information as may be required.
4. HOW TO OBTAIN THIS CIRCULAR. Additional copies of this circular, AC 150/5340-18, Taxiway Guidance Sign System, may be obtained from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D. C. 20590.



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1. INTRODUCTION. A taxiway guidance system consists of two basic types of internally lighted signs with yellow letters, numerals, and other symbols on a black background. These signs are classified as destination signs which indicate the direction to taxi to a particular destination and intersection signs which identify intersecting routes and Category II critical areas. Signs are placed at designated locations along the edges of taxiways or aprons to aid pilots in taxiing aircraft on an airport and to aid pilots in complying with ground traffic controller's taxiing instructions. The signs also substantially aid the ground traffic controller by simplifying instructions for taxiing clearances, routing, and holding of aircraft. The basic types of signs are shown in Appendix 2, Figures 1 through 4.
2. CONFIGURATION.
 - a. General. A taxiway guidance sign system is flexible in that the number and types of signs comprising a complete system at an airport may vary according to the operational need at a particular airport. Prior to determining the number and types of signs needed at an airport, local air traffic controllers and other operational groups using the airport should make a thorough study of the taxiway system layout. The basic configurations for internally lighted taxiway guidance signs are contained in Appendix 2, Figures 2 through 4.
 - b. Combination Use of Signs. As shown in Appendix 2, Figure 1, install a destination and an intersection sign, where practical, at intersections which require identification to clearly define the throat or entrance into the intersection route. This is particularly desirable for defining the throats of taxiways leading off the runways. The use of both the signs at an intersection will always bracket the entrance to the route since the intersection sign is always placed on the near or approach side of the intersecting route and the destination sign is placed on the far side, as shown in Appendix 2, Figure 1. The use of both signs is also desirable as it provides the pilot with all the necessary information at intersections, that is, direction for his destination as well as his location.
 - c. Use of a Single Sign. Use destination signs, wherever practicable, to mark all major routes since the taxiway sign system is based on the use of the destination sign as the primary element of the system. Where destination signs are not practical or where it is desirable to identify intersecting routes, install intersection signs. Installation of a single sign may be sufficient particularly at taxiway intersections. Where demands of ground traffic dictate, additional signs can be installed later.

- d. Category II Hold Line Signs. Install signs at either or both ends of a Category II hold line marking; except that, where the hold line marking exceeds 150 feet in length, a sign at each end of the hold line marking will be required. Signs may be required adjacent to runways to identify the critical areas where hold line markings are not installed across usable runways. See Appendix 2, Figure 2 for detailed "Category II" hold line sign installations for critical areas.
- e. Alternate Routes. At intersections or junctions of runways, taxiways, or runways and taxiways, where the possibility of alternate routes to a particular destination exists from a given direction of travel, the destination sign shall indicate only one route to follow. See Appendix 2, Figure 3(c) for detailed alternate route placement of signs.
- f. Destination Signs.
 - (1) General. Provide destination signs for both inbound and outbound taxiing routes where required as shown in Appendix 2, Figure 4(c).
 - (2) Outbound Destination Signs. Mark outbound routes from their beginning to their termination point with destination signs showing the appropriate runway numbers. Outbound routes usually begin at the entrance of a taxiway from an apron area. Its termination point will be at the takeoff end of the appropriate runway. Outbound destination signs may show more than one runway destination number if the direction of travel on a taxiing route is the same to all the runway destinations shown on the sign. In such cases, separate any pair of runway destination numbers by a circular dot. See Appendix 2, Figure 3b(2) for typical destination outbound signs.
 - (3) Inbound Destination Signs. Mark inbound routes from their beginning with destination signs showing the appropriate symbols. Inbound routes usually begin at the entrance to a taxiway from a runway. Mark inbound traffic routes at the beginning with destination signs, with symbols, to show direction to only general destination areas on an airport. Provide destination signs, with symbols, showing specific areas at appropriate intersections along the inbound traffic route and closer to the general destination area. As an example, on the majority of airports, the destination signs installed at the entrances to a taxiway from a runway show, in most instances, the direction to the "RAMP," "E RAMP," "MIL," etc. Install destination signs at other locations along the inbound

c. Symbols and Arrows on Destination Signs. Place destination symbols and arrows on all destination signs to indicate the direction to taxi to the destination as shown in Appendix 2, Figure 3(b). Locate the arrow to the left of the destination symbol when the direction to taxi is straight ahead or involves a left turn. Locate the arrow to the right of the destination symbol when the direction to taxi involves a right turn. Place destination symbols consisting of runway numbers assigned in accordance with Advisory Circular 150/5340-1A on all outbound destination signs for marking outbound routes. Use the following standard symbols to identify inbound destinations:

- (1) General parking, servicing, and loading areas - RAMP
- (2) Areas specifically set aside for aircraft parking - PARK
- (3) Areas where aircraft are fueled or serviced - FUEL
- (4) Gate position at which aircraft are loaded or unloaded - GATE
- (5) Areas set aside for itinerant aircraft - VSTR
- (6) Areas set aside for military aircraft - MIL
- (7) Areas set aside for freight and cargo handling - CRGO
- (8) Areas set aside for handling international flights - INTL
- (9) Hangar or hangar area - HGR

NOTE: Add a prefix or suffix letter or numeral to a sign, e.g., "N RAMP" (for north ramp), "GATE 2," etc., to distinguish between similar destinations at different geographical locations on an airport. Leave space between a prefix or suffix letter or numeral added to a sign.

d. Power Supply. Normally, in designing a taxiway guidance sign system, the signs are considered a part of either a taxiway edge lighting system or a centerline taxiway lighting system. In this case the signs are installed in the 6.6-ampere primary power supply circuit of these systems in lieu of designing a separate taxiway guidance sign lighting system. Where a separate taxiway guidance sign lighting system is designed, the systems and material used are as specified in Advisory Circular 150/5340-15A. To obtain the primary load for each size sign to be connected in a 6.6-ampere primary circuit, use the loads specified below and then add 2.8 watts per 100 feet of No. 8 AWG cable used to connect the sign in the circuit for total connected load.

SIGN LOADS

Number of Panels	Transformer Size	Number of Lamps 325 Lumen or 30 Watt	Primary Load Watts Transformer With Lamp Plus Losses
1	30/45 Watts	1	41.0
2	30/45 Watts	2	82.0
3	100 Watts	3	115.0
4	100 Watts	4	154.0
5	200 Watts	5	181.0
6	200 Watts	6	216.0
7	200 Watts	7	253.0

Multiple signs are connected directly to the multiple 120/240-volt primary power supply cables. Primary cable sizes between the signs and the distribution transformer must be calculated for each installation. Base calculations for total connected load for each sign on the use of a 25-watt lamp per sign panel. See Appendix 2, Figure 6 for calculations to determine line losses for multiple sign circuits.

4. EQUIPMENT AND MATERIAL.

- a. General. Equipment and material covered by FAA specifications are specified by reference number and title as noted under "Bibliography" in Appendix 1. Where Items L-108, L-110, and P-610 are mentioned in succeeding paragraphs, they refer to the lighting installation specifications of Advisory Circular 150/5370-1A.
- b. Listed Equipment and Material. The equipment and material listed are required for a taxiway guidance sign system where they are considered a part of an existing taxiway lighting system. Where a separate taxiway guidance sign system is to be installed, this equipment will also be required along with the applicable equipment specified in Advisory Circular 150/5340-15A.
- c. Taxiway Sign Fixtures. Use taxiway signs which conform to the requirements of Advisory Circular 150/5345-4. Each sign is furnished with a lamp or lamps, connecting leads, panels, and mounting assemblies.

- d. Lamps. Use one of the lamps specified below for taxiway signs.
- (1) Series Circuits. 30-watt, 6.6-ampere, C-2V filament, T-10 clear bulb, 1-1/2-inch light center length, 3-5/16-inch maximum overall length, 1000 hours, medium prefocus base or a 325 lumen, 6.6-ampere, C-8 filament, A-21 clear bulb, 2-3/4-inch light center length, 5-5/16-inch maximum overall length, 2000 hours, medium prefocus base.
- (2) Multiple Circuits. 25-watt, 120-volt, C-9 filament, A-19 clear bulb, white or frosted bulb, 2-1/2-inch light center length, 3-5/16-inch maximum overall length, 1000 hours, medium screw base.
- e. Cables. Use primary cables conforming to the requirements of Advisory Circular 150/5345-7 of the type, AWG size, and voltage as specified on the plan for series and multiple circuits.
- f. Counterpoise Wire. Use bare copper counterpoise wire conforming to the requirements of Item L-108, paragraphs 108-2.3 and 108-3.9.
- g. Insulating Transformers. Use insulating transformers conforming to the requirements of Advisory Circular 150/5345-22 and Advisory Circular 150/5345-31 on series circuits. Use the size insulating transformer specified below for the size sign indicated.

TRANSFORMERS TO BE USED

Number Panels	Transformer Size (Watts)	Type	Advisory Circular
1 and 2	30/45	I II	AC 150/5345-31
3 and 4	100		AC 150/5345-22
5, 6, and 7	200		AC 150/5345-22

- h. Bases. Use one L-809 base per sign conforming to the requirements of Advisory Circular 150/5345-6 using a 2-inch by 3/4-inch hot dipped galvanized pipe reducing bushing and a 3/4-inch hot dipped galvanized conduit stub, with all male threads liberally coated with pipe joint sealer compound, to make a watertight joint and to prevent corrosion of bare male threads.
- i. Primary Cable Connectors. Use primary cable connectors conforming to the requirements of Advisory Circular 150/5345-26.

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- j. Squeeze Connectors. Use squeeze connectors, 3/4-inch conduit to cable, if specified, which are similar and equal to Crouse-Hinds Type CGK conduit to cable connector with neoprene rubber bushing.
- k. Ducts and Conduits. Where required, design ducts and conduits to conform to the requirements of L-110, paragraphs 110-2.2 through 110-2.7.
- l. Concrete Pads. The concrete for pads shall be proportioned, placed, and cured in accordance with Item P-610, Structural Portland Cement Concrete.
- m. Tape. Use plastic electrical insulating tape conforming to the requirements of Item L-108, paragraph 108-2.4(e).
- n. Stakes. Use a stake, where specified, for one and two panel signs conforming to Advisory Circular 150/5345-20 with a suitable 2-inch tapped flange welded or bolted to the stake for receiving a 2-inch tapered male thread breakable coupling. In addition, provide a removable split holding cup or other device on the flange fitting to accommodate and hold a rubber receptacle (Figure 1c of Advisory Circular 150/5345-26) of the secondary transformer lead in a positive position near the disconnect point. See Appendix 2, Figure 5.

5. INSTALLATION.

- a. General. Installation of a taxiway guidance sign system consists of internally lighted taxiway guidance signs for series or multiple circuits furnished and installed in accordance with this advisory circular at the location and in conformity with dimensions, layout, design, and details shown on the plans. See Appendix 2, Figure 5 for typical 3-panel sign.
- b. Installation Criteria for Signs.
 - (1) Location of Signs.
 - (a) Sign Substitution for Existing Elevated Taxiway Lights. At all intersections where there are existing elevated taxiway lights, replace either the single taxiway light or the double "Entrance-Exit" lights located opposite the point of tangency of the paving fillet with a sign. See Appendix 2, Figure 4(b)(1).

(b) New Construction. At all intersections of taxiways or aprons in new construction, locate the sign opposite the point of tangency of the paving fillet so that the side of the sign closest to the taxiway or apron edge is not less than 10 feet and not more than 20 feet from such edge. See Appendix 2, Figure 4(b)(2). At intersections of taxiways with runways, locate the "Entrance-Exit" signs as shown in Appendix 2, Figure 4b(3).

(2) Orientation of Signs. Orient all signs so that the face of the sign is approximately 90 degrees to the direction of the taxiing path from which it is viewed.

(3) Height of Signs. Install signs so that the overall height, including mounting supports, is not less than 20 inches nor more than 30 inches.

(4) Category II Hold Line Signs. Locate Category II hold line signs at either or both ends of Category II hold line, except that where the line exceeds 150 feet in length, locate a sign at each end not more than 15 feet from the nearest pavement edge as shown in Appendix 2, Figure 2.

c. Installation Procedures. Following are the various installation procedures for base-mounted taxiway guidance signs for series or multiple circuits.

(1) Concrete Pads. Install a concrete pad for series or multiple installations at the approximate location shown on the plans. Exact location and orientation shall be as directed by the engineer. Construct a concrete pad with dimensions not less than 2 feet by 2 feet by 4 inches for signs having only one support. For signs having two or more supports, the concrete pad shall not be less than 2 feet wide by 4 inches in thickness and of a length extending 1 foot beyond the end supports. Pour the concrete pad in place in undisturbed soil. Reinforce the concrete pad with steel bars formed and placed as indicated on the plans. Slope the surface of the concrete at 1/2 inch per foot. Finish the exposed surface of the concrete pad to a smooth finish with a steel trowel or by rubbing. Install a minimum of one transformer base housing in each concrete pad. Where required, place anchor bolts for additional flange supports in the concrete pad in accordance with the manufacturer's instructions. See Appendix 2, Figure 7 for a three and four panel concrete pad.

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- (2) Stake Mounted. Where specified for one and two panel signs, install the sign on a metal stake which has been installed at a depth of 30 inches in a 6-inch hole at the location indicated on the plans. Do not install the stake by driving. Backfill with thoroughly compacted earth passing a 1-inch sieve. The stake should be vertical within 3 degrees. When specified, backfill the stake with concrete to form an anchor 6 inches by 6 inches by 12 inches or precast the anchor on the stake before installation. Use an insulated or bare neutral wire when a neutral connection is required. See Appendix 2, Figure 5.
- (3) Leveling. Adjust and firmly hold in place the transformer base housing during the construction of the concrete pad so that the machined upper surface of the base flange will be level within ± 2 degrees and not more than $3/8$ inch above the surface of the pad. All other bearing areas for the additional flange supports shall be in the same horizontal plane as the transformer base flange.
- (4) Cable Entrance. Install the primary cable between signs or between signs and taxiway lights as specified in Item L-108. Pull the primary cable into the transformer base housing. Where specified, seal the cable $3/4$ -inch conduit entrance to the base with a squeeze connector. Use a rubber bushing of the correct size to fit the outside diameter of the cable where squeeze connectors are specified. Tighten the connector sufficiently to provide a watertight seal without deforming the insulation and sheath of the cable.
- (5) Cable Connections.
 - (a) General. Pull the underground supply cable into each transformer base housing and leave sufficient slack cable inside the base to permit all cable connections to the taxiway sign to be made above the ground. Use the specified supply circuit as shown on the construction plans and specifications.

(b) Types of Supply Circuit Connections.

- 1 Direct Connections. Plug transformer primary lead connectors directly into mating connectors of field-attached or factory-molded plug-in splices on the supply cables as called for on the plans. Attach connectors to the supply cable and tape mating connectors as specified in Item L-108.
- 2 Pigtail Splicing Leads. Connect pigtail splicing leads, when supplied with the transformer, to the supply leads by means of either a cast splice, a vulcanized splice, or a taped splice. Make the splice as specified in Item L-108.
- 3 Neutral Connections. Use either an insulated or bare neutral wire where a neutral connection is required. Connection is made as described in the manufacturer's installation instructions.
- 4 120/240-Volt Multiple Circuits.
 - a General. Insulating transformers are not used for 120/240-volt multiple circuits. Use a two-conductor pigtail lead with a minimum length of 24 inches with a cable connector conforming to Figure 1c of Advisory Circular 150/5345-26 attached for connection to the power supply cable. "T" splice one conductor to the hot side of the incoming power supply cable and "T" splice the other conductor to the neutral side of the incoming power supply circuit. Normally, the neutral wire will be a bare conductor and the hot side will always be an insulated conductor.
 - b "T" Splices. Make "T" splices by removing the overall jacket for a distance of 6 inches from the pigtail and of the two-conductor cord attached to the Figure 1c rubber receptacle. Remove the insulation on each of these two conductors for a distance of 3 inches and thoroughly clean the bare copper wire. Next remove the jacket and insulation from a section of the insulated underground supply cable by penciling jacket and insulation so as to leave 1/2 inch of bare conductor exposed. Tightly wrap one of the bare lead wires of the cord around

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the bare section of the supply feeder and make a soldered connection. Apply plastic electrical tape, one-half lapped, over the bare wires. Proceed to continuously build up tape over the entire "T" splice section to 1-1/2 times a cable diameter. Apply the tape with ends tapered a distance of approximately one inch over the original jackets of the cable and cord. Take care when applying the tape to seal the area where the two conductors emerge from the overall jacket of the cord. Wrap the other lead wire of the cord around the neutral conductor of the supply circuit and make a soldered connection. Apply a wrapping of tape over this joint to give added mechanical protection. Do not use glyptol or lacquer over vinyl plastic tape as they react as a solvent to the tape.

c Optional Connectors. Use a type "C" sleeve crimp connector or a split bolt connector, where specified, in lieu of the "T" splices. Apply insulating tape over these splices as specified for the "T" splices.

(6) Identification Numbers. Assign an identification number to each sign in accordance with the plans. Use one of the following methods for the placing or provision of identification numbers.

- (a) Yellow Numbers. Paint or stencil numbers in yellow paint not less than 2 inches high nor more than 4 inches high on one end of the sign.
- (b) Black Numbers. Paint or stencil numbers in black paint not less than 2 inches high nor more than 4 inches high on the runway or taxiway side of the transformer housing base plate.
- (c) Noncorrosive Disc With Number. Attach a noncorrosive disc, 2 inches minimum diameter, with numbers permanently stamped or cut out to one end of the sign by at least two metal screws. As an alternate, install the disc under the head of a base plate bolt.
- (d) Impressed Numbers. Form impressed numbers by a dye or matrix not less than 3 inches high nor more than 6 inches high on the surface of the concrete pad on a side toward the runway or taxiway.

(7) Assembling Taxiway Sign. Assemble the taxiway sign in accordance with the manufacturer's instructions. Install a lamp or lamps of the proper rating in the sign. Install the sign so that the distance from finished grade to the top of the sign is as indicated on the plans but in no event less than 20 inches and not more than 30 inches. Connect the sign to the power supply lead as follows:

(a) Series. Connect the secondary leads of the transformer to the sign leads with a disconnecting plug, Figure 1c, and a receptacle, Figure 1(a), conforming to Advisory Circular 150/5345-26 without tapping joint. See Appendix 2, Figure 5.

(b) Multiple. Connect the two-cord "T" connected power supply lead to the two-cord sign lead with a disconnect plug Figure 1(c) conforming to Advisory Circular 150/5345-26 without tapping joint. See Appendix 2, Figure 5.

6. TESTING, MAINTENANCE, AND INSPECTION. Test, maintain, and inspect the taxiway sign installation as specified in Advisory Circular 150/5340-15A.

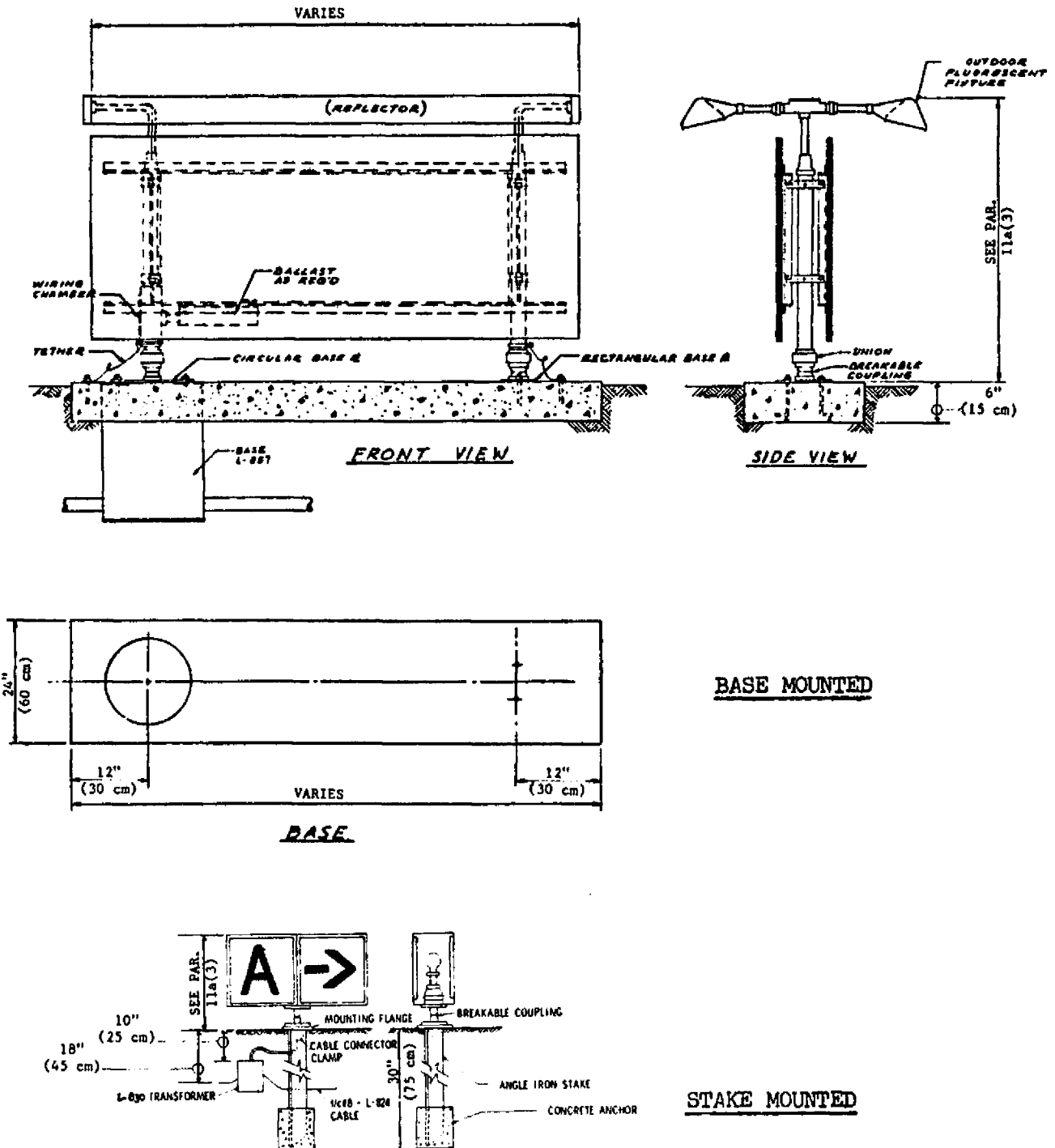


Figure 3. Typical sign mounting.

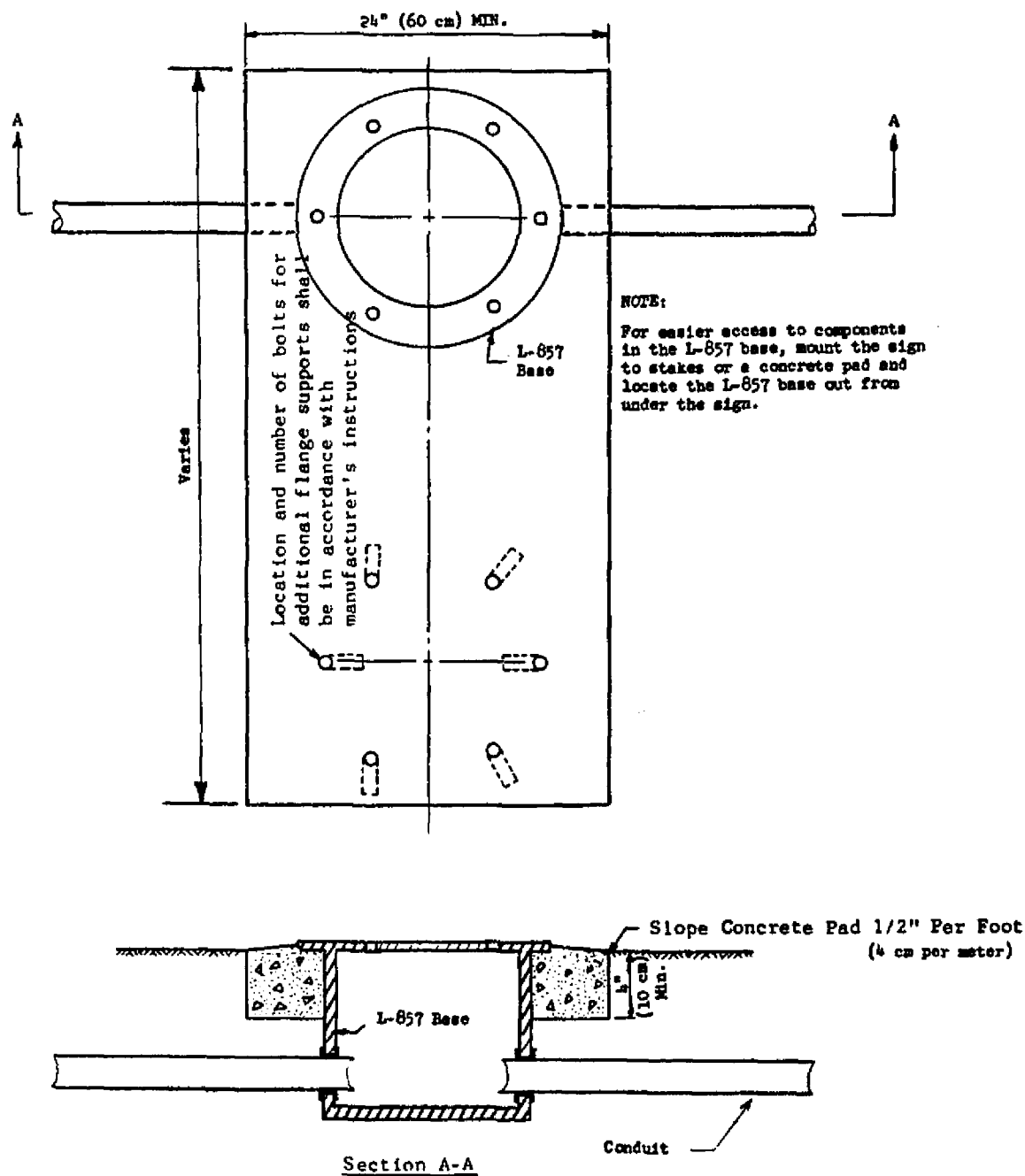


Figure 4. Typical concrete sign base.