AC 150/5340-15A

TAXIWAY EDGE LIGHTING SYSTEM

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DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

CHANGE

AC NO: 150/5340-15A CHG 1
DATE: 4/2/68

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: CHG 1 TO ADVISORY CIRCULAR 150/5340-15A,
SUBJECT: TAXIWAY EDGE LIGHTING SYSTEM

1. PURPOSE. This change transmits Appendix 2, Page 13, to the subject advisory circular.

2. EXPLANATION OF CHANGE. Corrected curves for estimating length of the AC control cables have been added.

3. PAGE CONTROL CHART.

Remove Pages	Dated	Insert Pages	Dated
APPENDIX 2		APPENDIX 2	
13	11/1/67	13	4/2/68
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Initiated by: AS-580

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Federal Aviation Agency

ADVISORY CIRCULAR

AC NO: AC 150/5340-15A
AIRPORTS
EFFECTIVE: 11/1/67

SUBJECT: TAXIWAY EDGE LIGHTING SYSTEM

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1. PURPOSE. This advisory circular describes the recommended standards for the design, installation, and maintenance of a taxiway edge lighting system.

2. CANCELLATIONS. The following publications are cancelled:

   a. AC 150/5340-15, Taxiway Lighting System, dated November 18, 1965.

   b. TSO-N3b, Taxiway Lighting, dated April 1, 1961.

3. REFERENCES. Technical publications listed under Bibliography, Appendix 1, provide further guidance and detailed information as may be required.

4. EXPLANATION OF REVISION. In addition to minor changes in the text, the following additions have been made:

   a. Taxiway edge lighting layouts have been added.

   b. Electrical operating characteristics for components used in the 120 volts AC control circuit have been added.

   c. New circuit diagrams have been added for the original diagrams.

   d. A curve for estimating length of AC control cable has been added.

5. HOW TO GET THIS PUBLICATION. Obtain additional copies of this circular, AC 150/5340-15A, Taxiway Edge Lighting System, from the Department of Transportation, Distribution Unit, TAD-434.3, Washington, D.C. 20590.

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1. INTRODUCTION. A taxiway edge lighting system consists of omnidirectional blue lights which outline the usable limits of taxiing paths. The original concept of establishing aviation blue for taxiway lights took into account the very low transmission factor of blue filters. The purpose was to produce a de-emphasized light signal for closeup ground operations which could not be readily seen from the air or from great distances on the ground. This idea works well for simple taxiway layouts where few lights were used. However, at airports with complex and numerous taxiways, there developed an undesirable concentrated mass of blue lights. Shielding and brightness control have helped this condition.

2. CONFIGURATION.

   a. The basic design requirements for taxiway lighting layouts are contained in Appendix 2, Figures 1 through 8. Light fixtures are located not more than 10 feet off the full-strength pavement edge on each side and spaced longitudinally not more than 200 feet to define the lateral limits and direction of the taxiing paths. The longitudinal spacing is influenced by the physical layout of the taxiways. On long, straight sections, do not exceed 200-foot intervals. On short curves and at points of intersection with runways and other taxiways, use the spacings shown in Appendix 2, Figures 1 through 8. This guidance provides closer spacing on short sections, extra lights prior to entrance into curves, and closer spacing in the form of a lighted barrier where a taxiway intersects a runway but does not provide a crossover.

   b. Install taxiway guidance signs at an intersection of a taxiway with a runway to clearly define the throat or entrance into the intersecting taxiing route. Where taxiway signs would interfere with aircraft operation, use two taxiway lights, spaced 5 feet apart on a line perpendicular to the centerline of the runway (Appendix 2, Figure 6), instead of the sign.

   c. Avoid the use of runways as taxiways. However, where the airport layout requires the use of the runway as a taxiway path, separate taxiway fixtures and circuits, in addition to the runway lighting system, may be used.

3. DESIGN.

   a. Light Installation. Either of two types of taxiway edge light installation is acceptable. The same fixture is used in both.

(1) Base Mounted. The fixture is mounted on a base which provides access to transformer and primary cable connections. The base is installed with a concrete backfill. This method is desirable from a maintenance standpoint and provides added protection of the equipment.

(2) Stake Mounted. The fixture is mounted on metal stakes with associated transformers, primary cables, and cable connectors buried in the ground adjacent to the stake. Stakes may require concrete anchors where soil is unstable. This method is economical and, since the transformers, cables, and connectors are designed for direct earth burial, should render many years of fault-free service if specified procedures are followed in the initial installation.

b. Power Supply.

(1) Series Systems. Provide a 4KW or 7-1/2KW constant current regulator having a primary rating of 240 volts, single phase, 60 cycle and a secondary rating of 6.6 amperes, designed for remote control, with or without provisions for varying the output current to a lower value. Brightness control is achieved by varying the output current and provides the desired light intensity for different visibility conditions. Use two brightness steps, 6.6 amperes 100 percent and 5.5 amperes 30 percent on taxiway circuits. Determine the KW size and the number of regulators for a specific 6.6 ampere series lighting circuit by use of the curves of Appendix 2, Figure 9.

(2) Multiple Systems. Taxiway lighting systems utilizing 120/240-volt multiple circuits are supplied from the existing power supply or distribution transformer and are controlled through circuit breakers or individual safety switches. Multiple circuits are only recommended for short segments of taxiways close to the control distribution center. The reason for limiting the use of multiple circuits is the excessive voltage drop, depending on the circuit load, which increases as the distance separating the supply point from the multiple circuit load increases.

c. Cable for Primary Circuits.

(1) Series Circuits. Use 3KV, No. 8 AWG, Type B, stranded, single conductor, direct burial cable for a system designed for a 6.6 ampere series circuit with a constant current regulator.

(2) Multiple Circuits. Use 600 volt, No. 8 AWG, Type A, stranded, single conductor, direct burial cable for multiple circuits.

d. Lamp Load Supply Circuits.

(1) Series Systems. Supply the lamp load for fixtures as well as taxiway guidance signs through a 6.6/6.6 ampere individual insulating transformer. This isolates the lamp from the high primary voltage of the series circuit. In the event of a single lamp burnout in the taxiway series circuit, the circuit continuity will not be broken.

(2) Multiple System. Connect the lamp load directly to the 120/240-volt multiple circuit. No insulating transformer is necessary.

e. Control Systems.

(1) Taxiway Lighting Control Systems. Where possible, use simple switching circuits to energize and de-energize the circuits or to control lamp brightness.

(a) Direct Control. Direct control systems are controlled at the power supply by switching the branch circuits supplying their power. This type of control system is normally used for taxiway lighting systems at utility airports. On those airports with 120/240-volt multiple taxiway lights, use auxiliary circuit breakers on the regulator where the proposed taxiway loads do not exceed the design capacity of the circuit breakers; or a two pole, three wire, solid neutral safety switch; and/or separate circuit breakers. For automatic control use a photoelectric or astronomic time switch with provision for automatic to manual control switching. For typical applications of direct control for utility airports using 120/240-volt multiple circuits, see Appendix 2, Figure 10.

(b) Remote Control. Remote control systems are controlled from a panel located in the cab of the control tower or at some other location. The panel controls operating relays located in the vault from which power is supplied to the taxiway lighting regulators. Use the following two systems of control circuit voltages for remote control of taxiway circuits.

1 120 Volts AC. Where the distance between the remote control panel and the vault is not great enough to cause an excessive voltage drop in the control leads, use the standard control panel switches to operate the control relays directly. Operating relays supplying power to the taxiway regulators must have coils rated for 120 volts AC. Use No. 12 AWG control cable to connect the control panel to the power supply equipment in the vault. Calculate the maximum permissible separation between the control point and the vault by determining the control circuit line loss. Use the operating characteristics of the electrical components shown in Figure 1 below. Special pilot low burden auxiliary relays, having proper coil resistance to reduce control current, may be used to obtain additional separation distance with 120-volt AC control circuits. It may be advantageous to use these relays to expand existing 120-volt AC control systems. For typical applications, see Appendix 2, Figures 11, 12, and 13 for maximum voltage drop for 120-volt AC control circuits.

FIGURE 1. ELECTRICAL COMPONENT OPERATING CHARACTERISTICS

Coil	Regulator Size	Coil Resistance	Operating Volts	In-Rush Current	Pull-In Volts	Holding Current	Drop-Out Volts
Primary Contactor	4KW		120	1.4	99	0.22	77
Brightness Relay	4KW		120	0.92	99	0.20	77
Primary Contactor	7½KW		120	5.0	99	0.78	77
Brightness Relay	7½KW		120	0.93	99	0.38	77
L-816 Relays			120	0.75	100	0.18	70
Auxiliary Relay	SPDT	5000 ohms	120		95-75	0.024	70

2 48 Volts DC. Where the distance between the control panel and the vault would cause excessive control voltage drop, use a low voltage (48-volt DC) control system. In such a system, sensitive pilot relays are activated by the remote control panel switches and, in turn, control the regulator relays through their contacts. Normally, a 25 pair, No. 19 AWG telephone cable can be used to connect the control panel to the pilot relays. The DC control system is adequate for up to 7900 feet separation between control point and vault. For typical application details, see AC 150/5345-3 and Appendix 2, Figures 11 and 12 of this advisory circular.

(2) Selector Switch. A selector switch is available for special application to select short segments of separate taxiway lighting series circuits supplied from the same regulator. This switch can be remotely controlled from separately installed circuit breakers or the control panel.

(a) The selector switch described in AC 150/5345-35 is available in two types and is designed with contact ratings for 10 amperes at 600 volts.

1 Type I for control of single series circuit.

2 Type II for control of up to three series circuits.

(b) Where there are more than three series circuits to be remotely controlled, use combinations of Type I and Type II circuit selector assemblies to remotely control additional series circuits.

(c) Since the selector switch assembly conforming to AC 150/5345-35 is designed for a maximum of 600 volts, its use is limited on 6.6 ampere series circuits having a maximum 4KW load. For application of this selector switch, see Appendix 2, Figures 11 and 12.

. Duct and Conduit Systems. Install cable runs for underground power supply and control circuits in ducts or conduits in areas that are to be surfaced or stabilized. This will provide ready access for maintenance, modification of circuits, and protection for cables during repairs of the surfaced or stabilized areas. Provide a reasonable number of spare ducts or conduits in each bank for maintenance and future expansion of facilities and avoid routing ducts or conduits through areas which may have to be excavated. Assure that duct or conduit dimensions meet National, State, or local electrical codes.

g. Brightness Control, Shielding, and Lamp Masking. Use bright control, shielding, and lamp masking to eliminate the "sea-o: effect which occurs when viewing blue lights at full intensi during good visibility. The use of brightness control will result in considerable increase of lamp life. Appendix 2, Figure 14 illustrates typical lamp masking. This figure sho how fixtures using masked lamps are oriented and the lamp ma recommended (see paragraph 4c(3) for lamp designation). Ori fixtures with masked lamps by rotating the fixture on its mo for proper light pattern before securing in place. Proper c circuiting will also help to eliminate the "sea-of-blue" eff providing lighting only where it is needed.

4. EQUIPMENT AND MATERIAL.

a. General.

(1) Equipment and material covered by FAA specifications are specified by reference number and title, as noted under "Bibliography" in Appendix 1. Where L-108 and L-110 are mentioned in succeeding paragraphs, they refer to the li installation specification of AC 150/5370-1, Standard Specifications for Construction of Airports, with Change Supplement No. 2.

(2) The vault should be the type shown on the plans. Construction should be reinforced concrete, concrete masonry, or brick wall as specified. Use distribution transformers, oil switches, cutouts, and all other regularly used commercial items of equipment not covered by FAA specifications which conform to the rulings and standards of the electrical industry.

b. Light Fixtures. Use taxiway lighting units which conform to requirements of AC 150/5345-23. Each lighting unit is furnis with an optical system, lamp, connecting leads, and a mountin assembly.

c. Lamps. Use one of the lamps specified below for the taxiway fixture.

(1) Series lamp, 30-watt, 6.6 ampere as specified in AC 150/5345-23.

(2) Multiple lamp, 40-watt, 115-volt as specified in AC 150/5345-23.

(3) Masked series lamp, 30 watts, 6.6 ampere shall be similar and equal to General Electric Type 6.6A/T10/4P. (To be used where shielding is desired).

d. Cables. Use primary cables conforming to the requirements of AC 150/5345-7 of the type, AWG size, and voltage as specified on the plans.

e. Counterpoise Wire. Use bare copper counterpoise wire conforming to the requirements of L-108, paragraphs 108-2.3 and 108-3.9.

f. Insulating Transformers. Use taxiway light insulating transformers conforming to the requirements of AC 150/5345-31 and on series circuits use taxiway sign insulating transformers conforming to the requirements of AC 150/5345-22.

g. Regulators. Use constant current regulators of 4KW and 7-1/2KW capacity, with or without brightness control, with standard input voltage of 240 volts, single phase, 60 cycle and output of 6.6 amperes. These regulators should conform to the requirements of AC 150/5345-11 and AC 150/5345-21. Use regulators conforming to AC 150/5345-18 to control short segments of 120/240-volt multiple taxiway circuits where these regulators are used for runway service on utility airports.

h. Bases. Where required, use bases conforming to the requirements of AC 150/5345-6.

i. Metal Stakes. Where required, use metal stakes conforming to the requirements of Figure 3 of AC 150/5345-23.

j. Junction Boxes. Use junction boxes conforming to the requirements of paragraph 7f(1)(d) of AC 150/5345-23.

k. Primary Cable Connectors. Use primary cable connectors conforming to the requirements of AC 150/5345-26.

l. Squeeze Connectors. Use squeeze connectors, if specified, which are similar and equal to Crouse-Hinds Type CGB cable connector with neoprene rubber bushing.

m. Ducts and Conduits. Design ducts and conduits to conform to the requirements of L-110, paragraphs 110-2.2 through 110-2.7.

n. Concrete. Concrete backfill and stake anchoring concrete should be proportioned not leaner than a 1-3-6 mix and should have a compressive strength of not less than 2000 psi.

o. Tape. Use plastic electrical insulating tape conforming to the requirements of L-108, paragraph 108-2.4(e).

p. Control Panel. Use control panels conforming to the requirements of AC 150/5345-3.

q. Auxiliary Relay Cabinet. Where required, use an auxiliary relay cabinet assembly for 48-volt DC control which conforms to the requirements of AC 150/5345-13. The auxiliary relay, where used in a 120-volt AC control circuit, should be a hermetically sealed relay having a single pole double throw (SPDT) contact arrangement rated for 5 amperes at 120 volts AC and a coil resistance of 5000 ohms. The relay connections may be either solder terminals or plug-in.

r. Control Cables.

(1) When using control cables (multiple conductors) containing No. 12 AWG wires, it should conform to the requirements of AC 150/5345-7.

(2) When using control cable containing No. 19 AWG wires, it should comply with Rural Electrification Administration (REA) Bulletin 345-14, REA Specification for Fully Color-Coded, Polyethylene Insulated, Double Polyethylene-Jacketed Telephone Cables for Direct Burial.

s. Circuit Selector. Use circuit selector cabinet assemblies conforming to the requirements of AC 150/5345-35.

5. INSTALLATION.

a. General. Install vault equipment, conduit, cables, bus bars, grounds, and supports necessary to insure a complete and operable electrical distribution center for taxiway lighting systems as specified and shown on the plans. When specified, provide an emergency power supply and transfer switch. Install and mount the equipment to comply with the requirements of the National Electric Code and local code agencies having jurisdiction. A typical vault layout for taxiway lighting equipment is shown in Appendix 2, Figure 15.

b. Installation Procedures. Following are the various installation procedures for elevated taxiway edge lighting units, for base mounted and/or stake mounted, for series and/or multiple circuits.

(1) General. Assemble the light fixture using the manufacturer's instructions. Connect the secondary leads of the transformer to the fixture leads with a disconnecting plug and receptacle conforming to AC 150/5345-26 without taping the joint. Install a lamp of the proper rating in the fixture. Do not extend the shearing groove of the breakable coupling more than 3-1/2 inches above finished grade. Level each fixture as recommended by the manufacturer to within 1 degree. Assign each unit an identification number in accordance with the plans to identify the unit by one of the following methods.

(a) Stencil numbers of 2-inch minimum height with black paint on the runway side of the base plate.

(b) Install a noncorrosive disc of 2-inch minimum diameter with numbers permanently stamped, cut out, or engraved under the head of a base plate bolt.

(c) Impress numbers of a 3-inch minimum height on a visible portion of the concrete backfill.

(2) Base Mounted. Encase light bases conforming to AC 150/5345-6 in concrete backfill at the locations indicated on the plans and mount taxiway light fixtures 14 inches above the ground plane on the bases. See Appendix 2, Figure 15 for layout and installation details.

(3) Stake Mounted. Install taxiway light fixtures 14 inches above the ground plane on metal stakes which have been installed at a depth of 30 inches in 6-inch holes at the locations 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" x 6" x 12" or precast the anchor on the stake before installation. For multiple circuit stake-mounted installations, assemble the junction box on the stake and make connections as recommended by the manufacturer's instructions. Bring the underground supply cables through the watertight bushings and make the external connections as recommended by the manufacturer. Be sure the rubber bushing inserts are of the correct size. After the cable is connected, draw up the bushings tightly on the jacket of the cable. Brush clean and assemble the access cover and gasket of the junction box. Use an insulated or bare neutral wire when a neutral connection is required. Connect it to the junction box or transformer leads. See Appendix 2, Figure 15 for layout and installation details.

(4) Frost Area Installation. In areas having ext conditions, the following installation proced recommended:

(a) Mount all taxiway lights on bases which ar in concrete backfill with conduit hubs seal

(b) Where base mounted units cannot be installed stake mounted units in the following manner:

1 Install primary cable connectors, splices, transformers at the same depth and in the s. horizontal plane as the primary cable with a slack provided where possible.

2 Do not use connector clamps on the stakes.

3 Place secondary leads from the transformer to t socket in a loose spiral with excess slack at th bottom.

4 Eliminate backfill material which will hold moistu and substitute permeable backfill material, such a. sand, around the primary connectors, transformer, a secondary leads; then cover the top surface with impervious material to reduce moisture penetration.

c. Bases. Install light bases in undisturbed soil with a concrete backfill having a diameter of at least 24 inches. Place the concrete while holding the base level to within 2 degrees of finished grade. The top of the concrete should slope away from the flange portion of the base so that a minimum of concrete is exposed above the leveled soil around the base.

d. Cable Installation.

(1) Install all primary cables and control cables by direct burial in trenches where the routing is under areas other than paved or stabilized.

(2) Trenching, the installation of cable, backfilling trenches, and the installation of cable markers should conform to L-108.

(3) Install cables in ducts and conduits to conform to L-108, paragraph 108-3.2.

(4) Install bare counterpoise wire for lightning protection, if specified, in the same trench for the entire length of the insulated cable it is to protect as specified in L-108, paragraph 108-3.9.

e. Cable Connections.

(1) Make in-line splices on the primary and secondary underground cables to conform to L-108, paragraph 108-3.8. Use connectors conforming to AC 150/5345-26. Do not splice in ducts, conduits, or in circuits between taxiway light fixtures.

(2) Where crimp connectors or field attached plug-in connectors conforming to AC 150/5345-26 are employed, use crimping tools designed for the specific type connector to assure crimps or detents meeting the necessary tensile strength.

f. Duct and Conduit. Trenching, installation of ducts and conduits, concrete backfilling, trench backfilling, installation of duct markers, testing of complete duct system, and the type of material should conform with L-110. A typical 4-way duct is shown in Appendix 2, Figure 15.

6. TESTING.

a. General.

(1) Check the installation and alignment of all lighting fixtures of the completed system to determine if the equipment has been installed as designed.

(2) Check and test all electrical circuits to assure the following:

(a) All circuits must be continuous and free of short circuits and unspecified grounds.

(b) All circuits must be properly connected in accordance with applicable wiring diagrams.

(c) Resistance to ground of all ungrounded conductors in all circuits must not be less than 50 megohms.

b. Primary and Control Cables. Test the primary and control cables as specified under the applicable sections of L-108.

c. Operational.

(1) Before connecting and energizing the regulator, make a 24-hour recording of the primary input voltage to determine which regulator voltage tap to use. If the maximum recorded voltage exceeds the 250-volt maximum tap, the input voltage should be corrected.

(2) Install lamps in all light fixtures for check-out. Operations with excessive open insulating transformer loads can damage a monocyclic type resonant circuit regulator.

(3) Check the open circuit protective device only once, then allow a five-minute cooling period before rechecking. Continuous cycling of the protective device can overheat and burn out the thermal relay.

(4) Test the installation by continuous operation for not less than one-half hour as a complete system including the functioning of each control not less than ten times. Test the completed circuit in accordance with the applicable provisions of Item L-108.

7. MAINTENANCE.

a. General.

(1) Taxiway lighting systems and auxiliary equipment normally operate with a minimum of attention. However, maintenance of taxiway lighting systems must take a prominent place in the maintenance schedule of the airport.

(2) Adopt a systematic maintenance schedule to insure maximum efficiency by detecting faults and avoiding deterioration of the system. If maintenance is not performed, the airport lighting system may become ineffective for many periods during the year.

(3) Proper maintenance should consist of a regular schedule of testing, cleaning, adjusting, repairing, and replacing worn-out or damaged parts. Dirty equipment contributes greatly to operation failures; therefore, keep all equipment free of dust, sand, surplus grease and oil, and other foreign material. Lamps must be replaced, glassware and reflectors must be cleaned, broken glassware replaced, and the insulation resistance of wires and cables must be maintained.

b. Personnel. The men entrusted with making periodic inspections of the lighting equipment and with the actual maintenance of the airport lighting system should be experienced and reliable electricians who have had experience with high voltage and series lighting circuits. An inexperienced man should not be assigned these duties because the high voltages that may be encountered on series circuits could be fatal.

c. Operational Check and Test. A daily check of the lighting system and test of equipment operation should be made at least one hour before sunset. The daily check of the lighting system should consist of a driving patrol to visually check for dimly burning lamps and for burned-out lamps which should be recorded for later maintenance check and for replacement of defective and burned-out lamps. The daily operation test of equipment should be assigned to a reliable and competent person stationed at the airport during the evening hours and who has been fully checked out on procedures to follow. These procedures should consist of turning on all airport taxiway lighting circuits to determine that each circuit is functioning normally. If malfunctioning of any lighting circuit is noted, the maintenance electrician should be notified immediately.

d. Test Equipment, Material, and Instruction Material. To properly maintain and effect quick repairs on taxiway lighting systems and equipment, the following test equipment, material, and instruction material should be provided:

(1) Test equipment used for preventive maintenance and trouble shooting:

(a) Split-Core Type Ammeter

(b) Ohmmeter

(c) Voltmeter

(d) Potential Transformer

(e) Ammeter

(f) Current Transformer

(g) Cable Fault Test-Detecting Set

(h) Low Voltage Insulation Resistance Tester

(i) Station-Type Neon Glow Lamp

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(2) An adequate supply of cable, lamps, glassware, cutouts, fuses, gaskets, and spare taxiway light fixtures.

(3) As-built taxiway lighting plans, showing location of all taxiway cable runs, control circuits, and wiring diagrams of each piece of equipment. Modifications or extensions made in connection with the above plans should be kept up to date by the chief electrician.

(4) A maintenance instruction book and descriptive parts list for each piece of installed equipment and test equipment.

(5) Storage space and work shop where the above material and information will always be available to maintenance personnel.

8. INSPECTION.

a. Inspect each light fixture to determine that it is installed erect, at the proper height, and in line with the other fixtures.

b. Check each light fixture to determine that a lamp has been installed and that each light fixture using masked lamps is properly oriented in accordance with Appendix 2, Figure 14.

c. Check the identification number of each fixture to determine that the number of each location is as assigned in the plans.

d. Check equipment covered by FAA specifications to determine if the manufacturers are approved suppliers. Check the equipment for conformance with specification requirements.

e. Inspect all cables, wiring, splices, ducts, and duct markers to assure that the installation is in accordance with AC 150/5370-1, Standard Specifications for Construction of Airports, and local codes. Inspect underground installations before the backfilling is completed.

f. Check the input voltage at the regulator's power and control circuits to determine that the voltage is within the specified limits.

g. Check fuses and circuit breakers to determine that they are of the proper rating.

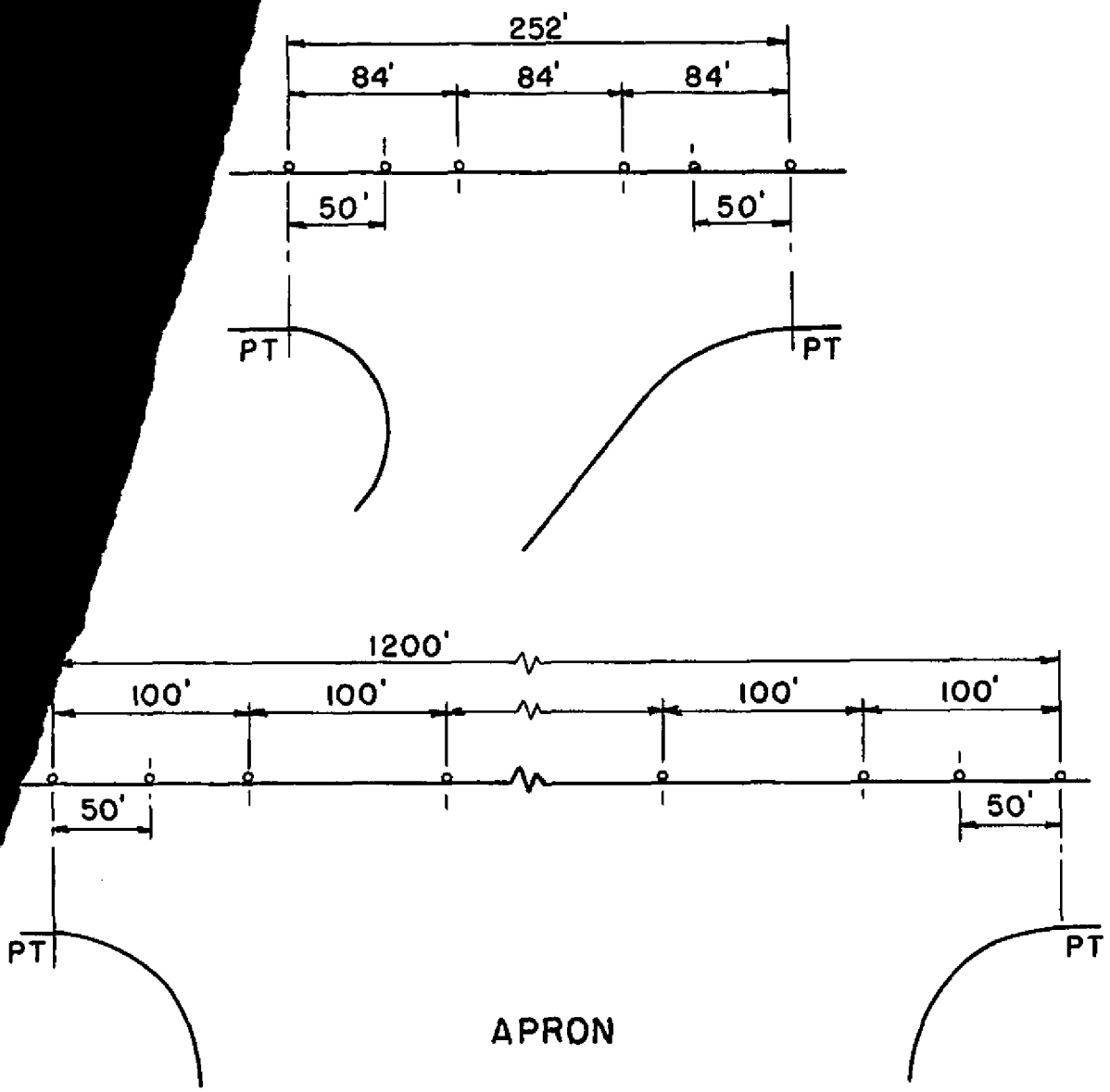


FIGURE 3. TYPICAL EXAMPLES SINGLE STRAIGHT EDGES - MORE THAN 200 FEET

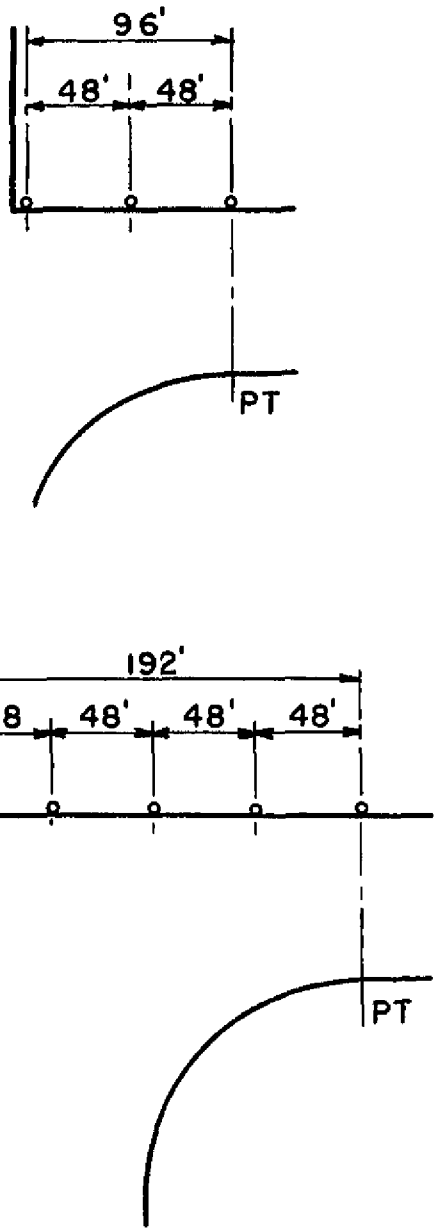


FIGURE 4. TYPICAL EXAMPLES SINGLE STRAIGHT EDGES - LESS THAN 200 FEET

APPENDIX 1. BIBLIOGRAPHY

1. Obtain copies of the following publications from the Department of Transportation, Distribution Unit, TAD-434.3, Washington, D.C. 20590.

   a. AC 150/5345-1A, Approved Airport Lighting Equipment.

   b. AC 150/5345-3, Specification for L-821 Airport Lighting Panel for Remote Control of Airport Lighting.

   c. AC 150/5345-4, Specification for L-829 Internally Lighted Airport Taxi Guidance Sign.

   d. AC 150/5345-6, Specification for L-809 Airport Light Base and Transformer Housing.

   e. AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits.

   f. AC 150/5345-11, Specification for L-812 Static Indoor Type Constant Current Regulator Assembly; 4KW and 7½KW; With Brightness Control for Remote Operation.

   g. AC 150/5345-13, Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits.

   h. AC 150/5345-18, Specification for L-811 Static Indoor Type Constant Current Regulator Assembly, 4KW; With Brightness Control and Runway Selection for Direct Operation.

   i. AC 150/5345-21, Specification for L-813 Static Indoor Type Constant Current Regulator Assembly; 4KW and 7½KW; For Remote Operation of Taxiway Lights.

   j. AC 150/5345-22, Specification for L-834 Individual Lamp Series-To-Series Type Insulating Transformer for 5000-Volt Series Circuit.

   k. AC 150/5345-23, Specification for L-822 Taxiway Edge Light.

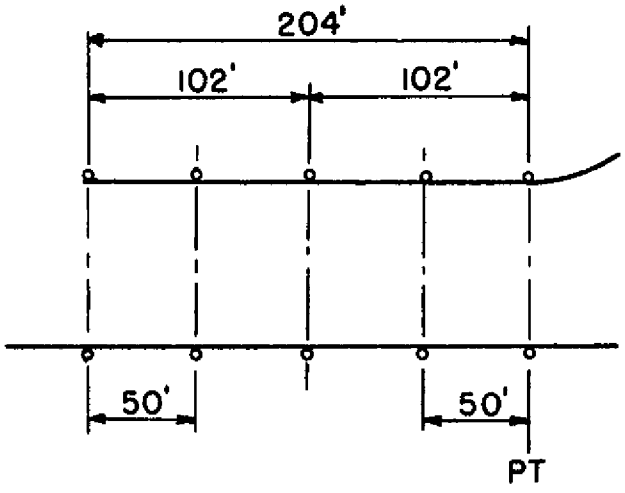
   l. AC 150/5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors.

m. AC 150/5345-31, Specification for L-833 Individual Lamp Series-To-Series Type Insulating Transformer for 600-Volt or 3,000-Volt Series Circuits.

n. AC 150/5345-35, Specification for L-816 Circuit Selector Cabinet Assembly for 600-Volt Series Circuits.

2. Obtain copies of AC 150/5370-1, Standard Specifications for Construction of Airports with Change 1, Supplement No. 2, from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Send check or money order with your request made payable to the Superintendent of Documents in the amount of $3.10 for each copy. No c.o.d. orders accepted.

3. Obtain copies of Rural Electrification Administration (REA) Bulletin 345-14, REA Specification for Fully Color-Coded, Polyethylene Insulated, Double Polyethylene-Jacketed Telephone Cables for Direct Burial from the U.S. Department of Agriculture, Rural Electrification Administration, Information Services Division, Washington, D.C. 20250.



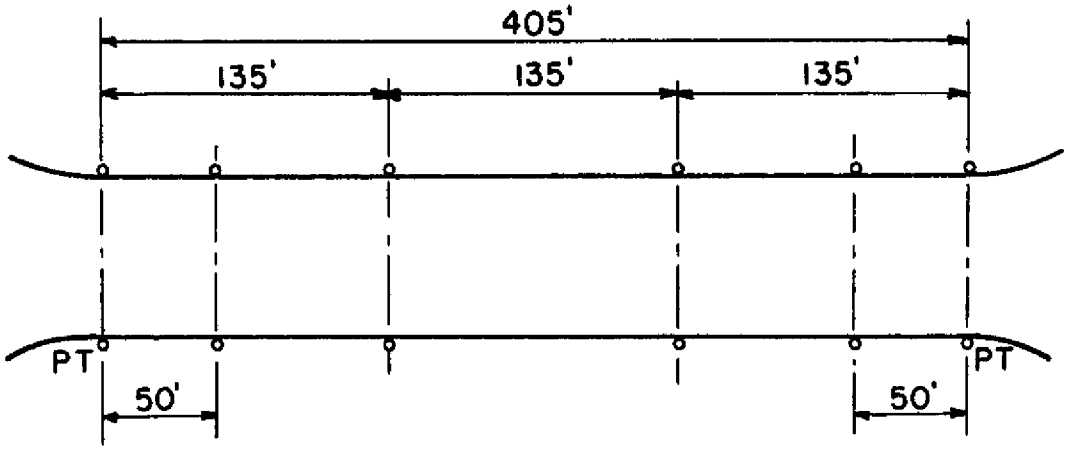


FIGURE 1. TYPICAL EXAMPLES STRAIGHT SECTIONS - MORE THAN 200 FEET

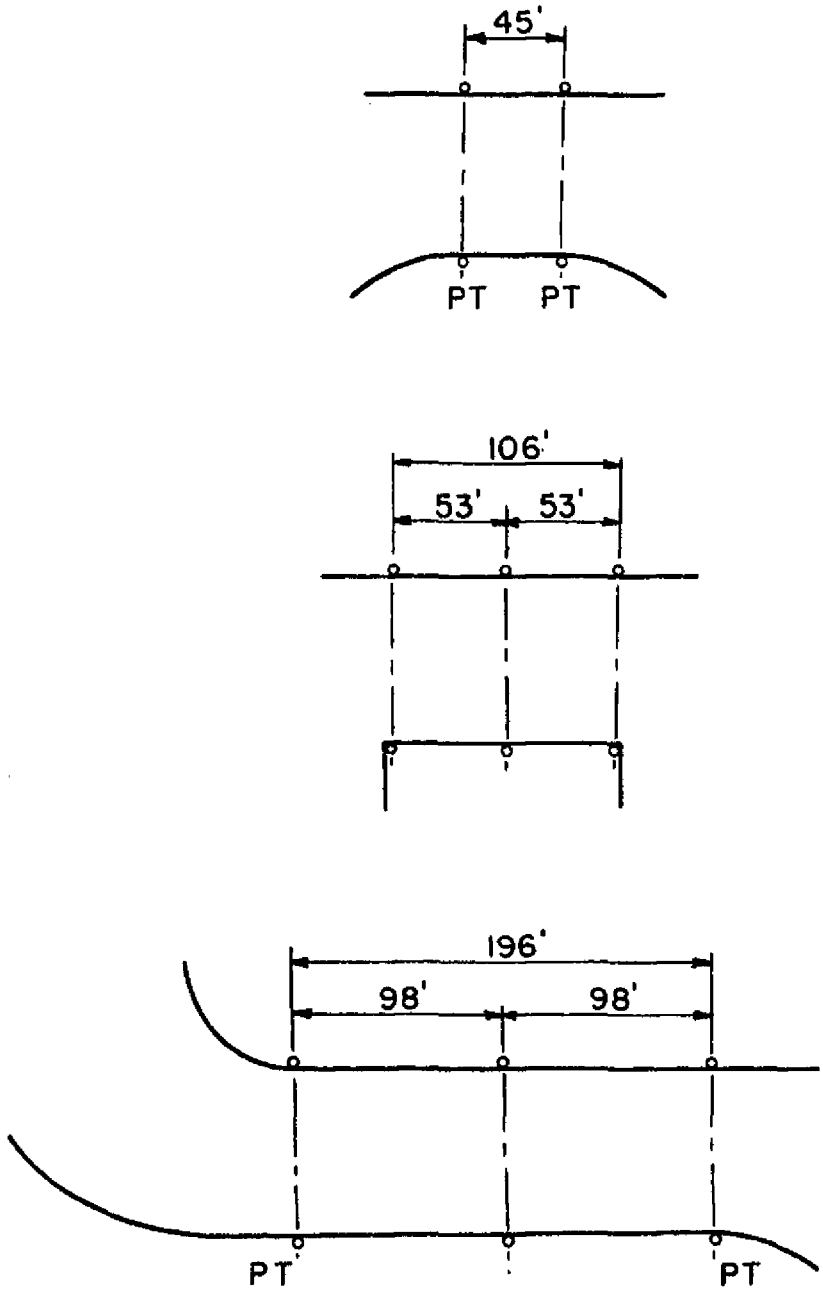
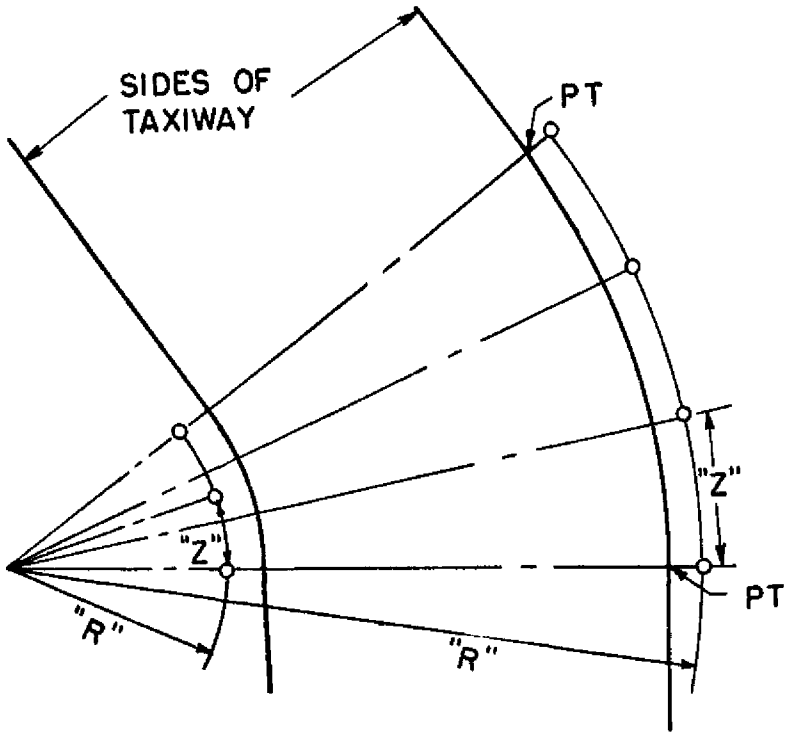


FIGURE 2. TYPICAL EXAMPLES STRAIGHT SECTIONS - LESS THAN 200 FEET



RADIUS "R" OF CURVE IN FEET	DIMENSION "Z" IN FEET	RADIUS "R" OF CURVE IN FEET	DIMENSION "Z" IN FEET
15	20	300	80
25	27	400	95
50	35	500	110
75	40	600	130
100	50	700	145
150	55	800	165
200	60	900	185
250	70	1000	200 MAX

NOTES: 1. For radii not listed, determine "Z" spacing by linear interpolation.

2. "Z" is the chord length.

FIGURE 5. SPACING OF LIGHTS ON CURVED EDGES

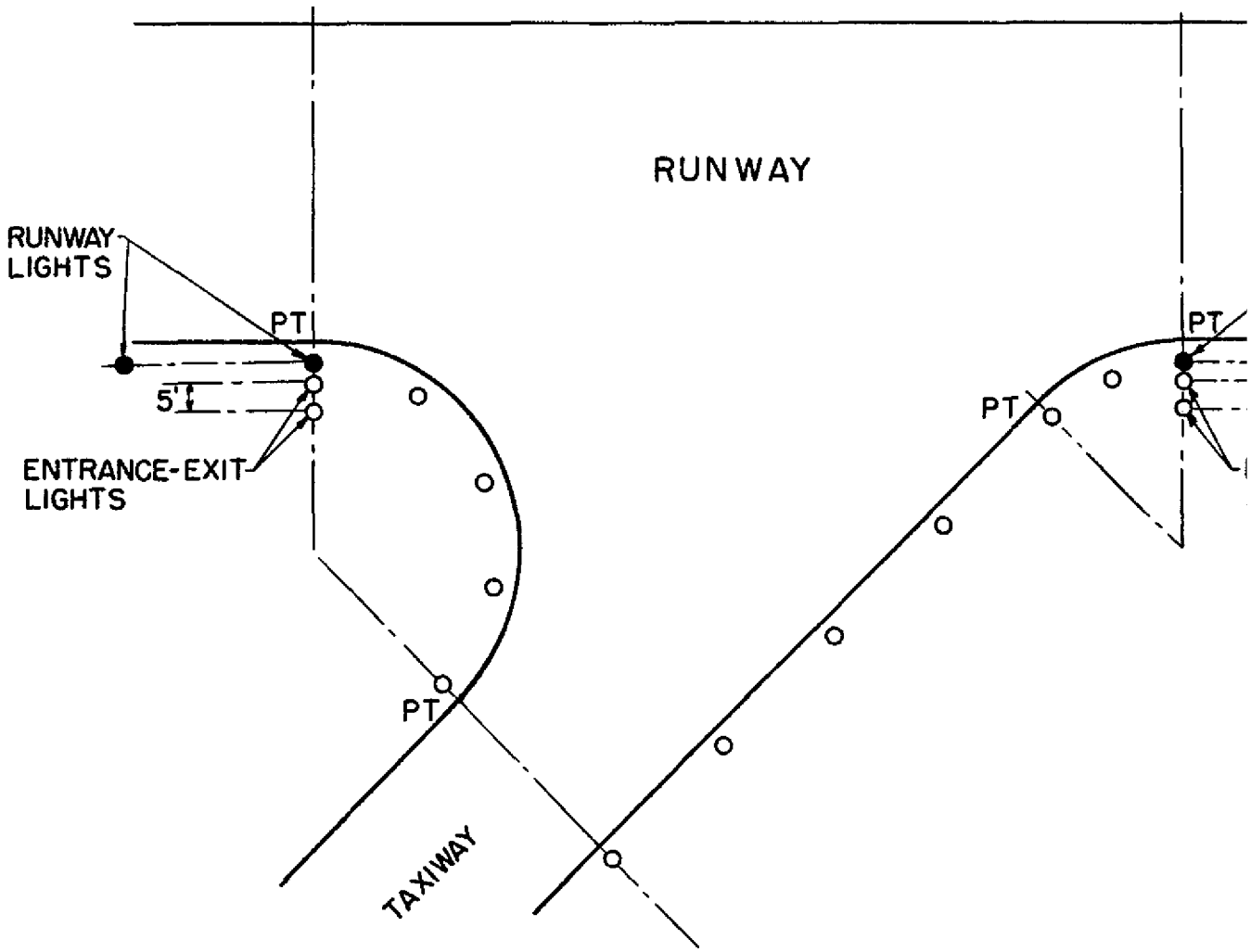


FIGURE 6. LOCATION OF ENTRANCE-EXIT LIGHTS

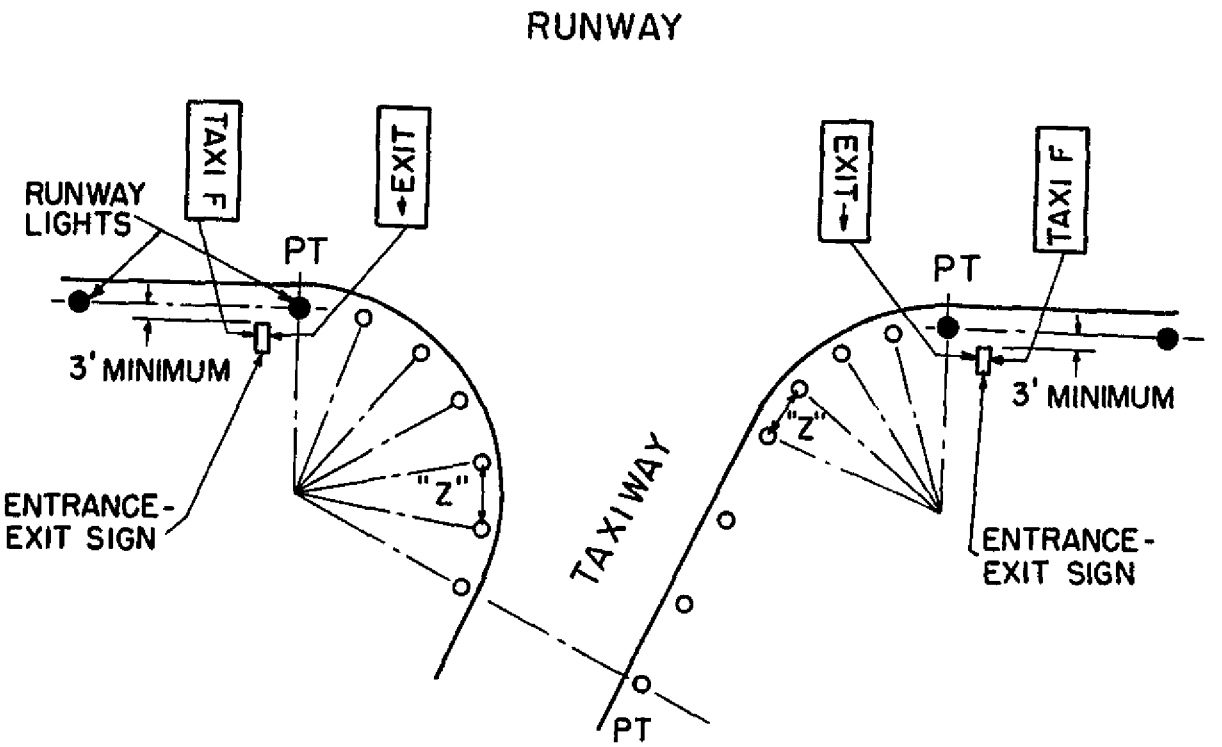


FIGURE 7. LOCATION OF ENTRANCE-EXIT SIGNS

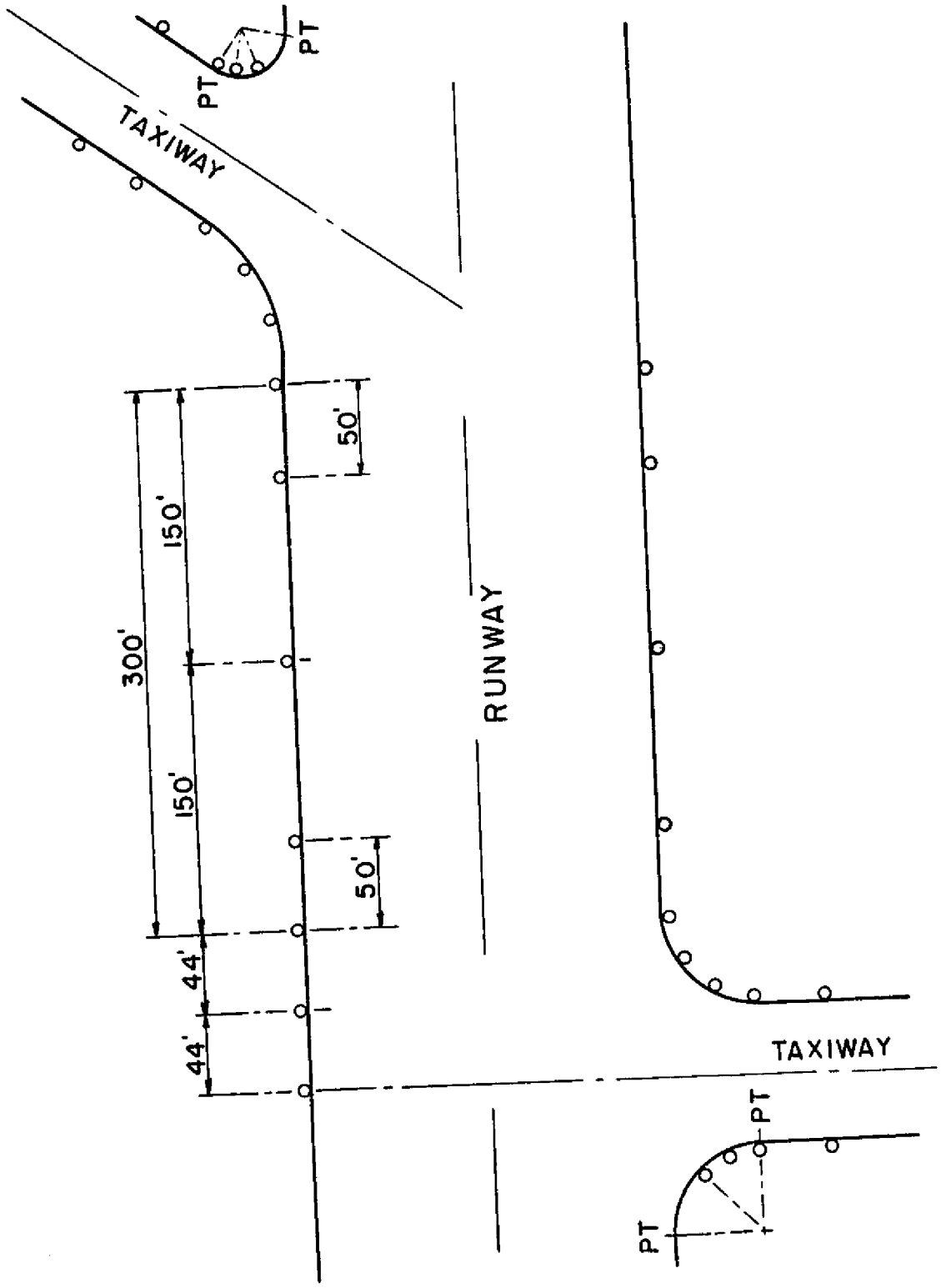
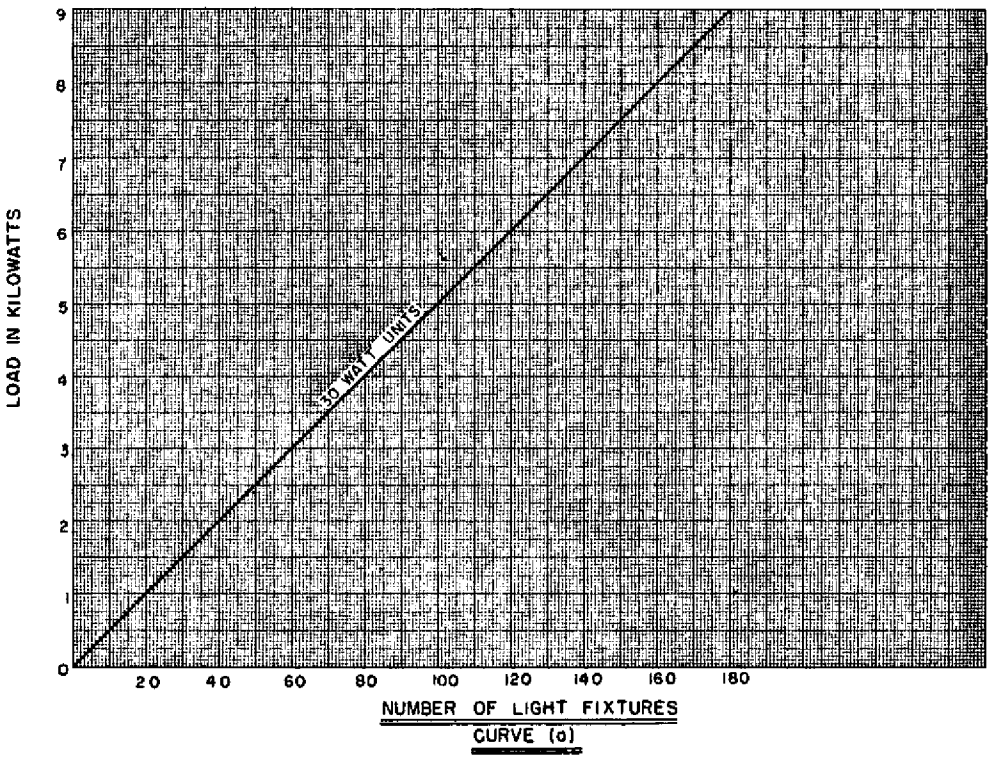
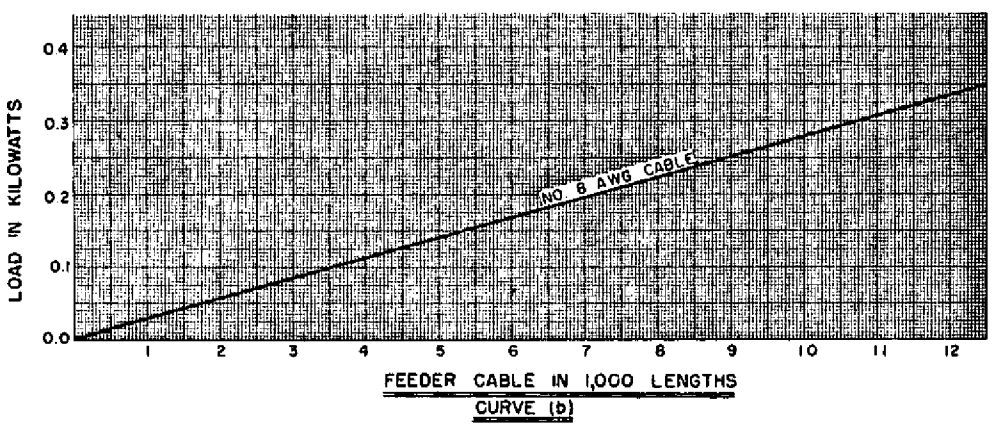


FIGURE 8. TYPICAL EXAMPLE PORTION OF RUNWAY USED AS TAXIWAY

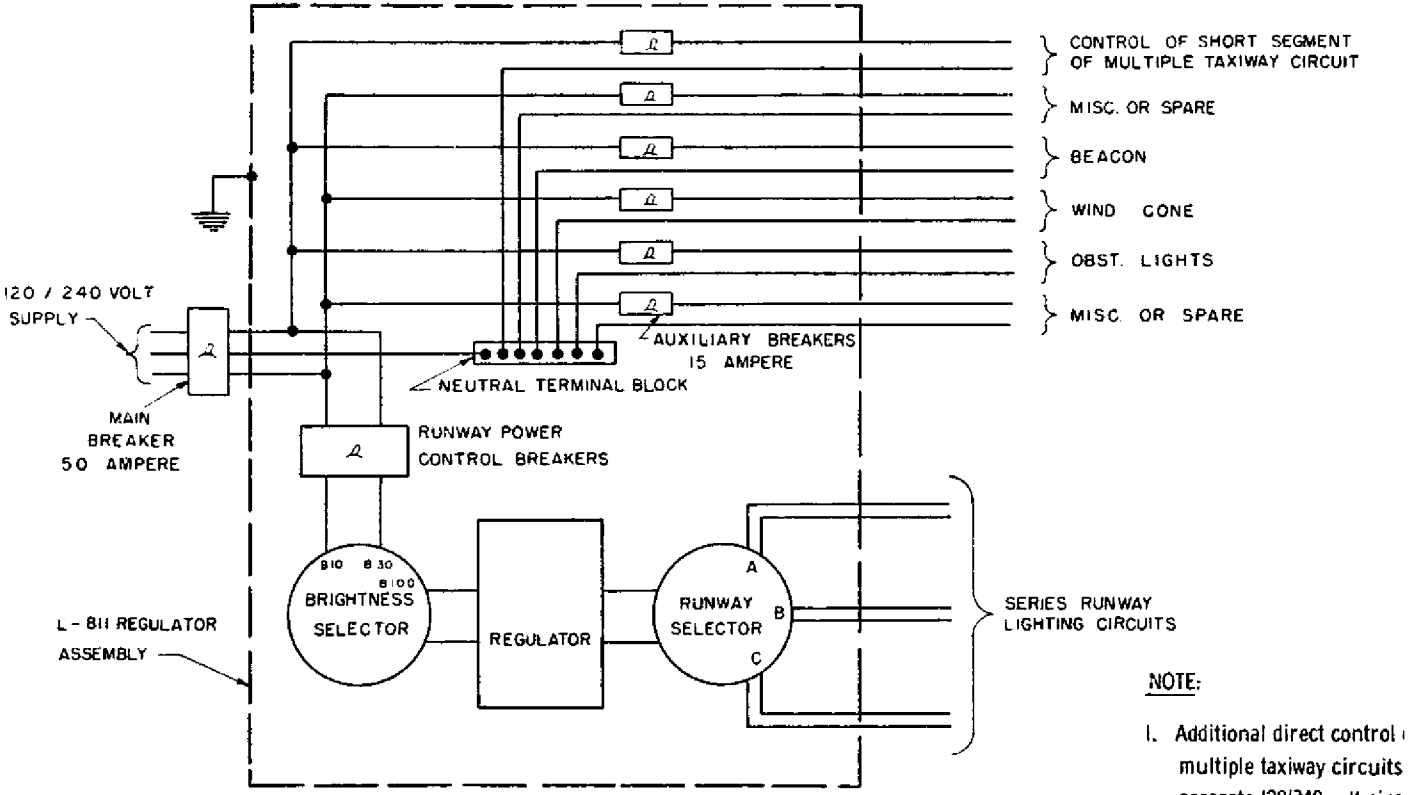




NOTES:

1. Computations based on actual circuit load tests.
2. In curve (a) figure KW load using total number of 30 watt fixtures in circuit.
3. Basis for computing load in curve (a)
   30/45 watt transformer with 30 watt lamp----- 10.4 watts
   Cable loss, lamp tolerance,etc. -------- ---- 9.6 watts
   Total estimated load per 30 watt unit---------50.0 watts
4. Basis for computing load per 1,000' of no. 8 AWG cable in curve (b) $I^2R = (6.6A)^2 \times 0.6405$ ohms/1,000' = 27.9 watts
5. Obtain total KW load per runway circuit by adding KW load obtained from curves (a) and (b).

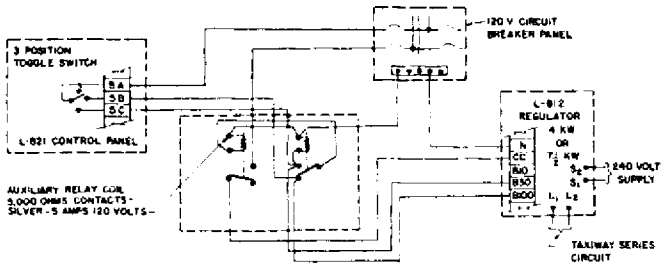
FIGURE 9. CURVES FOR ESTIMATING LOAD FOR TAXIWAY CIRCUITS



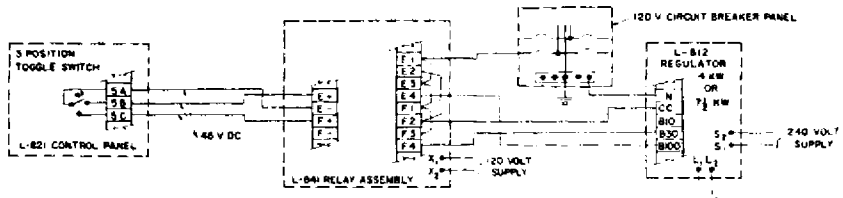
NOTE:

1. Additional direct control multiple taxiway circuits separate 120/240 volt circ panel and/or from a two neutral safety switch.

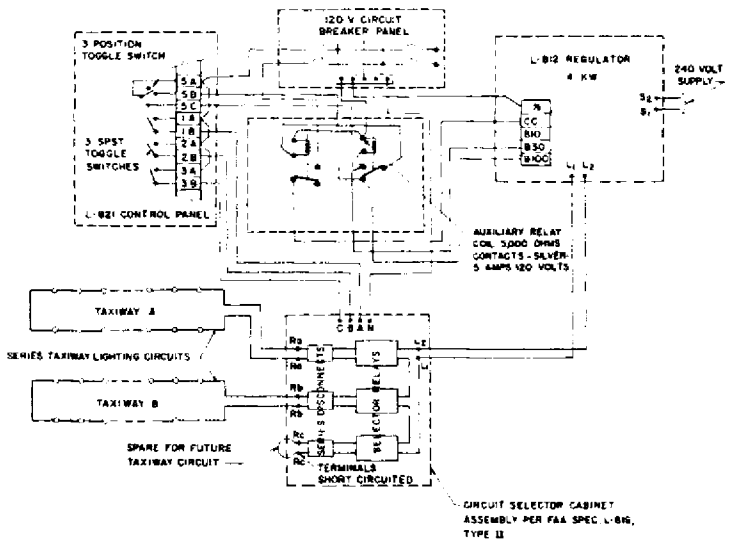
FIGURE 10. TYPICAL MULTIPLE TAXIWAY SYSTEM DIRECT CONTROL



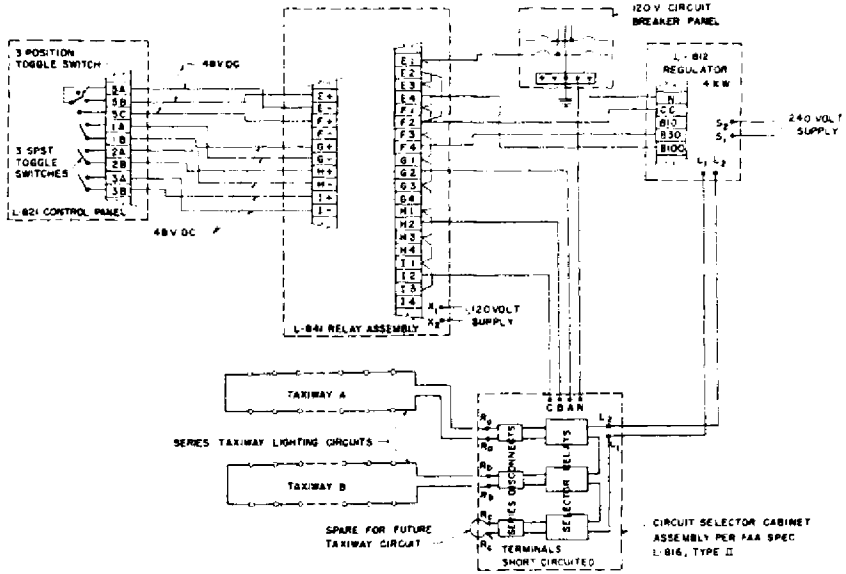
(a) 120 VOLT CONTROL VOLTAGE



(c) 48 VOLT CONTROL VOLTAGE



(b) 120 VOLT CONTROL VOLTAGE WITH AN L-816 SELECTOR SWITCH



(d) 48 VOLT CONTROL VOLTAGE WITH AN L-816 SELECTOR SWITCH

FIGURE 11. TYPICAL 120-VOLT AC AND 48-VOLT DC REMOTE CONTROL FOR AC 150/5345-21 REGULATORS

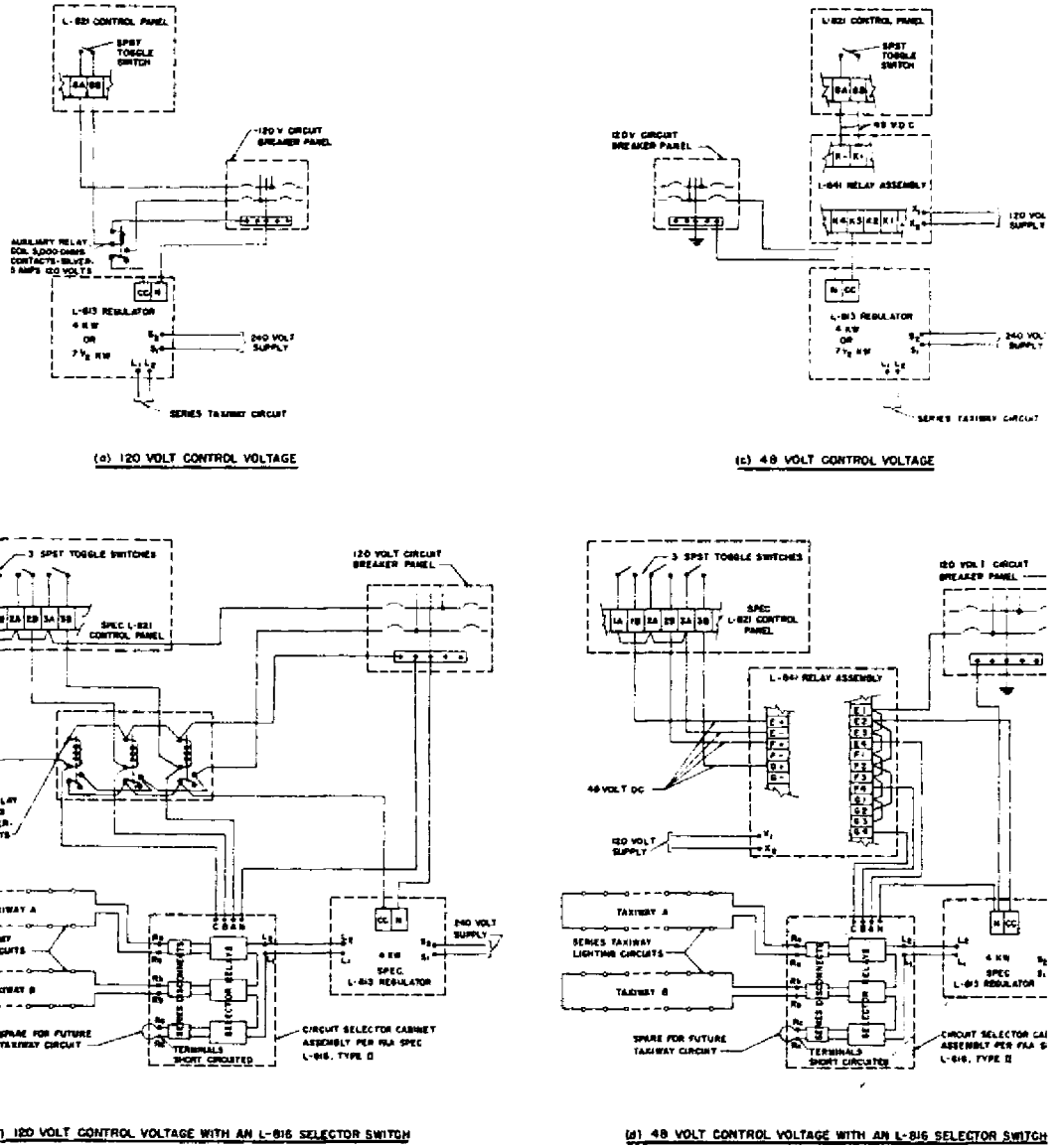


FIGURE 12. TYPICAL 120-VOLT AC AND 48-VOLT DC REMOTE CONTROL FOR AC 150/5345-1

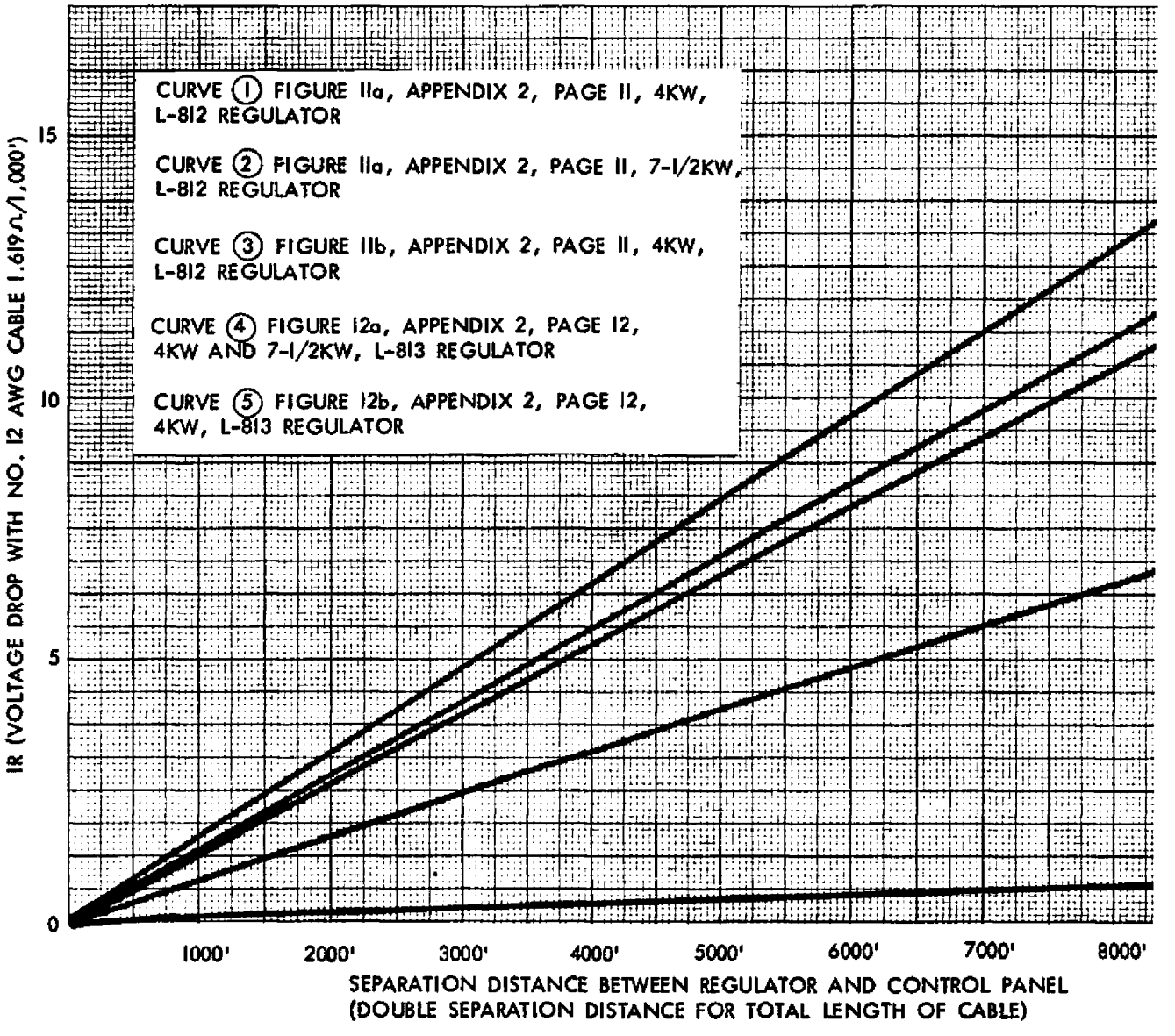
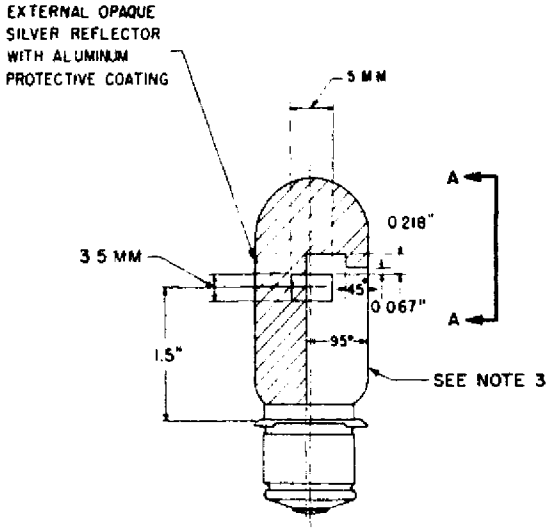
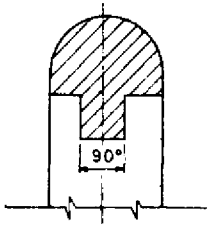


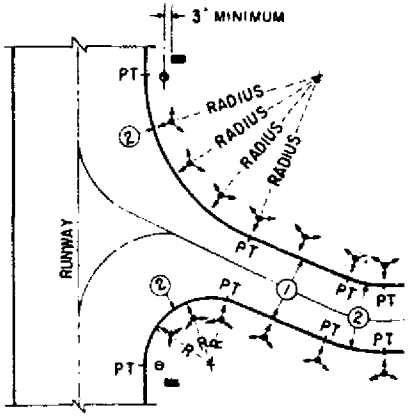
FIGURE 13. CURVES FOR ESTIMATING LENGTH OF AC CONTROL CABLE





VIEW A - A

TYPICAL LAMP MASKING



ORIENTATION OF TAXIWAY LIGHTS USIN

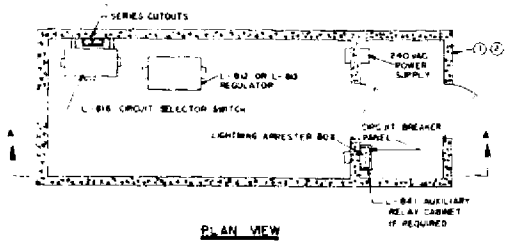
LEGEND

- ⓘ Runway light fixture
- PT Point of tangency
- ■ Taxiway guidance sig
- Taxiway light fixture

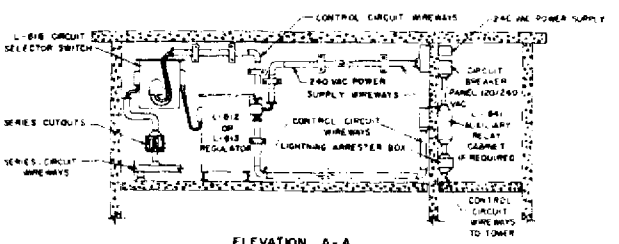
NOTES

1. Taxiway light fixtures on straight sections of taxiways : center of the light pattern will be perpendicular to the
2. Taxiway light fixtures on curved sections of taxiways center of the light pattern will fall on the extended r fixture location. See Figure 5 of Appendix 2 for spaci and for straight sections, see Figures 1, 2, 3 and 4 c
3. The lamp shown above is a 30-watt series lamp in acco of Advisory Circular 150/5345-23.

FIGURE 14. LAMP MASKING, LIGHT PATTERN, AND ORIENTATION OF TAXIWAY LIGHTS UTI

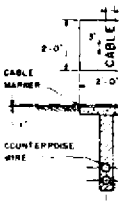


PLAN VIEW

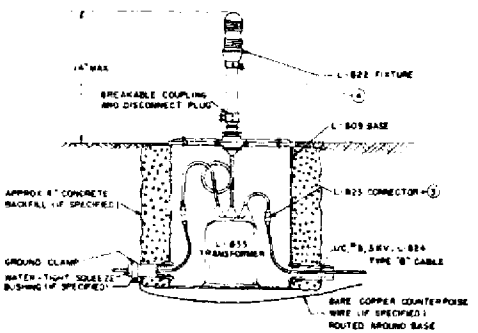


ELEVATION A-A

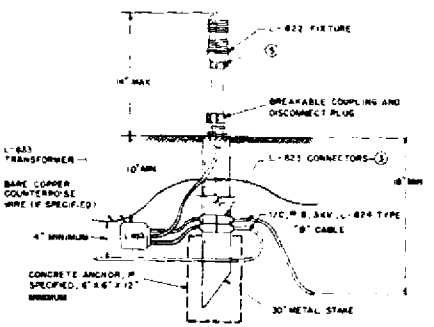
TYPICAL VAULT LAYOUT FOR TAXIWAY LIGHTING EQUIPMENT



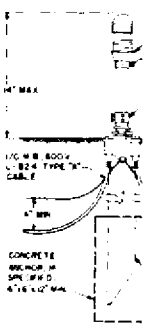
TYPICAL CAB
AND FO



6.6 AMPERE SERIES CIRCUIT
BASE MOUNTED



6.6 AMPERE SERIES CIRCUIT
STAKE MOUNTED

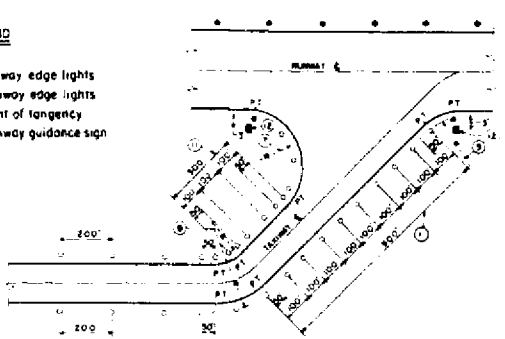


120 VOLT MULTI
JUNCTION BOX

TYPICAL TAXIWAY FIXTURE INSTALLATIONS

LEGEND

- ● Runway edge lights
- ○ Taxiway edge lights
- PT Point of tangency
- ■ Taxiway guidance sign



TYPICAL TAXIWAY LIGHTING CONFIGURATION
(HIGH DENSITY TRAFFIC AIRPORTS)

NOTES

(1) Vault construction and equipment installation are in accordance with the National Electrical Code, local codes, Item L-109 of FAA Standard Specifications for Construction of Airports

(2) An adequate number of lighting fixtures and electrical outlets are provided in the vault.

(3) Primary cable splices are made as specified in Item L-108 of FAA Standard Specifications for Construction of Airports.

(4) The L-822 fixture and the L-809 base are installed as specified in paragraph 5.

(5) The L-822 fixture and stake or junction box are installed as specified in paragraph 5

(6) The underground electrical duc
rified in the plans. The installati
in accordance with Item L-10
for Construction of Airports

(7)(8)(9) Spacing of lights on taxiway curv
of Appendix 2

(10) On long straight sections of tax
lights may approach but shall

(11) Spacing of lights on short straig
of Appendix 2. See Figures 2,
examples for other short straig

(12) Taxiway guidance signs are inst
Appendix 2. Where entrance-exi
lieu of signs, See Figure 6 of

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FIGURE 15. TYPICAL VAULT, FIXTURE, AND DUCT DETAILS

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