

## CHAPTER 7

# AUXILIARY LIGHTING AND ELECTRIC POWER

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### 7-1. Nature of auxiliary lighting and power

This chapter describes the auxiliary lights such as lighted wind cones, beacons, floodlights, and security lights, installed as required for the particular Army airfield, heliport, or helipad being constructed or modified. Electric power outlets, where installed, will be located as described in paragraph 7-4.

### 7-2. Wind direction indicator

A lighted wind direction indicator will be installed at new Army airfields, heliports, and helipads and at existing aviation facilities if such a device, or another device serving the same purpose, has not already been provided.

*a. Lighted wind cone.* The visual wind direction indicator normally will be a lighted cone, commonly known as a wind sock. It is the standard general-purpose wind indicator. It should be located outside the clearance zones in a conspicuous central location with respect to the airfield movement area, and in a location not influenced by turbulence created by adjacent structures or aircraft traffic. The wind cone normally will be mounted on a pipe assembly. Power for the wind cone may be from any available economic power supply source with the lighting circuit controlled from the control tower. Normally, the wind cone will be served by a low-voltage circuit that is fed from a branch circuit panel and is switched through one of the relays on the pilot relay cabinet assembly and the type MA-I Control Panel, as described in paragraph 10-4. The lighted wind cone will be Item No. 161A conforming to Part No. AN 2531-2 and Mil. Spec. MIL-I-7854 or Item No. 161B conforming to Part No. 2531-4 and Mil. Spec. MIL-I-7854, for tower and pipe mountings, respectively.

*b. Lighted wind tee.* A lighted-tee wind direction indicator will not be installed unless specifically directed or authorized. If approved for installation, however, only that part of the wind tee assembly that provides the visual function of this wind direction indicator will be utilized. The remote control wind director assembly with operator control will not be installed. The location, electric power supply, and control should be similar to that required for the lighted wind cone described above.

### 7-3. Other auxiliary lights

Special arrangements of lights, such as apron or parking area floodlights and protective and security lighting, may be required at an installation. These lights will not be connected to the airfield lighting circuits. Supply and/or control voltages for these lights will be obtained from appropriate supply and control panels located at suitable operating points. Fixed area lighting facilities, such as

floodlights for remote aircraft parking aprons and dispersed hardstands will not be provided unless specifically authorized or directed. However, portions of parking aprons and dispersed hardstands specifically designated for technical training or major maintenance activities will be provided with electrical outlets, for use with portable lighting equipment supplied from the local distribution system. Hangar access aprons (hangar entrances) will not be considered in the above category and may be lighted by floodlights installed around the apron or mounted on the hangar. Where lights mounted on the hangar are not sufficient to light the access apron, or supplemental lighting is required for maintenance operations, outlets will be provided for use by portable lighting equipment and will be integrated with the power outlets. Floodlights and outlets provided for these areas may be considered as part of the hangar construction.

*a. Floodlights.* Ground mounted floodlights normally will be of the portable type. However, where deemed appropriate for a particular installation, adjustable fixed type floodlights may be installed. Floodlights at ground level should be of a type developed primarily for the purpose of confining the light below the horizontal without glare to the pilot or ground personnel. The floodlight will have a lens providing a horizontal spread of approximately 180 degrees and will be designed to give an even illumination on the horizontally lighted surfaces. Floodlights will be mounted at low elevations, preferably not more than 3 feet above the surface of the apron or servicing area. Floodlights will be rugged construction, dustlight and weatherproof, suitable for outdoor installation on pipe stands, and will house a 200-watt minimum medium prefocus lamp. Floodlights for mounting on hangars will be of the general purpose type.

*b. Protective Lighting.* Where protective-security lighting is required for the boundary of an area, the type of floodlight used will be of the wide-angle type, equipped with a Fresnel heat resisting clear glass that will provide a horizontal beam spread of 180 degrees and a vertical spread not greater than 30 degrees. These floodlights may be suitable for operation on either multiple or series circuits, whichever is most appropriate for the particular installation. Each floodlight should be not less than 200 watts or 4,000 lumens, with rugged, dustlight and weatherproof construction. The mounting brackets will be adjustable to any position; the lamp focusing mechanism should be adjustable from the exterior of the fixture. Where areas inside the boundary, such as aprons and service areas, are floodlighted, floodlights mounted on poles or hangars should be of the general purpose type. When pole mounted, the height of the poles should ensure that, with proper adjustment of the floodlights, no glare or blinding light will

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affect aircraft operating in the traffic pattern or on the runways or taxiways. Poles should be located so as not to interfere with the line of sight from the control tower to the aircraft.

*c. Lighting intensities.* The various areas of the airfield, heliport, or helipad requiring normal and/or protective floodlighting will be lighted to meet the following intensities in foot-candles, in the horizontal plane.

*(1) Area lighting.*

Operations Building	
Parking Area	0.50
Loading Area	2.00
Apron	1.00
Maintenance	5.00*

**\*Note:** *Outlets for power and lighting should be installed at this area to supplement the lighting intensity at the work area and to focus light on the part of the aircraft being served.*

*(2) Protective lighting.*

Boundary	0.20
Entrances	
Active, pedestrian and/or conveyance	500
Inactive, normally locked, infrequently used	1.00
Building surroundings	1.00
Apron	1.00

### 7-4. Electrical outlets for power

Power outlets, where installed, will be located in accordance with the spacing criteria of TM 5-803-4. The outlets, when located off the paved areas, will be on pipe stands. Pipe stands will be located approximately 5 feet off the edge of the paving and have a minimum practical projection above adjacent paving. Where outlets may interfere with traffic movement, they should be installed in cast iron boxes with hinged top, mounted in concrete bases. The top of the base should be flush with the finished grade surrounding the base. All outlet installations should be of weatherproof construction and sized for the loads to be served.

### 7-5. Beacons

Aeronautical light beacons are high candlepower lights which present definite signals (colors and flashes) to identify the locations of airfields and heliport 5.

*a. Army airfields.* Station and identification beacons will be provided as follows:

*(1)* The station beacon, also known as the airfield or airport beacon, will flash alternate white and green flashes at the rate of 12 to 15 flashes per minute. The white flash will be double-peaked. The station beacon will be located no nearer than 750 feet nor farther than 5,000 feet from the control tower, and positioned so that the beacon is not in line of sight between control tower and the final approach to the runway. At Army airfield installations, an elevated water tank or similar type of structure normally will be found to be

an advantageous location for mounting the beacon. Where this type of structure is not available for mounting of the beacon, it will be mounted on a sufficiently high beacon tower, 50 to 75 feet in height, as most appropriate at the particular installation. The beacon will be installed so that the base is not less than 15 feet above the level of the floor of the platform or operations room of the control tower. Where surrounding terrain will unduly restrict visibility of the beacon, the 5,000-foot distance may be increased to a maximum of 2 miles from the nearest point of usable landing area, provided an identification beacon is installed on the airfield.

*(2)* If an identification beacon is required, it will be located as near as practicable to the appropriate inner limits noted for the airfield beacon at Army airfields above. This beacon will flash green, not more than 40 flashes or character elements (for coded signals) per minute.

*b. Army heliports (helipads).* The station identification beacon, also known as the heliport or helipad beacon, will be used to identify the location of heliport or helipad. This beacon will consist of a tricolored flashing beacon having a flash rate of 36 to 45 flashes per minute, 12 to 15 each of green, yellow, and white flash sequences per minute with the white flash being doubled peaked. Intensity of flashes will be such that the signal may be recognized for a distance of 1 mile in 1-mile meteorological visibility in daylight and 3 miles in 3-mile meteorological visibility at night, both from an altitude of 3,000 feet above ground level. The beacon will be located not nearer than 400 feet nor farther than 3,500 feet from the control tower, and positioned so that it is not in the line of sight between the control tower and the final approach to the heliport runway or the helipad. At Army installations, an elevated water tank or similar type structure may be used if located advantageously for the beacon. Where a structure of this type is not available for mounting the beacon, the beacon will be installed on a sufficiently high beacon tower, 50 to 75 feet in height, as most appropriate at the particular installation. The beacon will be installed so that its base is not less than 15 feet above the level of the platform or operations room of the control tower.

*c. Hazard beacons.* Hazard beacons are high-candlepower obstruction lights used to define particularly high or dangerous hazards to flight. Hazard beacons may be installed where an early or special warning is required, or used as an alternate to obstruction lights where obstructions are extensive and where use of obstruction lights would be impracticable or inadequate. Hazard beacons will emit a succession of aviation red flashes having a frequency of not less than 12 nor more than 40 flashes per minute.

*d. Electric service.* Beacons may be served by several methods depending upon local conditions. The methods of electric service include:

*(1)* A low-voltage electric service from the equipment vault if the beacon is located 800 feet or less from the vault.

(2) High-voltage electric service from the equipment vault having a distribution transformer of proper capacity located at the load sites. This method of supplying power normally will be used if the beacon site is located more than 800 feet from the equipment vault.

(3) A local source of electric power, either highvoltage or low-voltage, not from the equipment vault, controlled by a low-voltage control circuit or telephone relaying. These methods maybe used where the beacon site is remote from the vault, provided that experience of interruptions of service on the feeder to the beacon has been very frequent (one outage per year of less than 8 hours duration, averaged over the past 5 years).

*e. Beacon control system.* The station and identification beacons at an Army airfield or heliport will be controlled from the lighting control panel regardless of distance from vault to beacon. An auxiliary switch on the control panel will be used for this purpose.

*f. Voltage fluctuations.* For installations where the supply voltage to the station or identification beacons fluctuates five or more volts, a type E-1 constant voltage transformer, Item No.323, conforming to Mil. Spec. MIL-T-8368 should be installed ahead of the beacon lamp. Characteristics of the transformer are such as to accept an input voltage ranging between plus or minus 10 percent of normal while providing a steady 120-volt output. Use of this transformer materially reduces lamp burnouts. The transformer is designed to serve only the beacon lamp. The beacon motor and obstruction lights adjacent to the beacon lamp will not be connected to the transformer.

*g. Installation methods.* Installation of the beacon, electric power supply, control wiring, and construction of the beacon mounting will conform to applicable criteria of this manual and to other applicable criteria, FAA Advisory Circulars, and the manufacturers' recommendations.

*h. Description of beacons.*

(1) The airport or station beacon will be a 24-inch rigid drum, duplex rotating beacon, Item No.307 conforming to Part No. MS 25444 and Mil. Spec. MIL-L-7158. It has one double-beam white lens and a single-beam green lens. Each drum is provided with a lamp changer using two 1,200-watt, 120-volt, T-20 mogul bipost base lamps. The lamps will be Item No. 585, conforming to Part No. MS-25015-2

and to Mil. Spec. MIL-L-6363. Four lamps are required for the beacon. The lamp changer assures dependable operation and is equipped with an adjustment for beam elevation. The beam rotates at six r/min.

(2) The identification beacon, also known as the auxiliary beacon, will be a type G-1 beacon, Item No.266, confirming to Mil. Spec. MIL-L-6273. It will be equipped with two green filters, Item No.270, conforming to Mil. Spec. MIL-L-6273, and two 620 watt, 120-volt, PS-40 mogul prefocus base lamps, Item No.590 conforming to Mil. Spec. MIL-L-6363. A type D-1 flasher, Item No.302, conforming to Mil. Spec. MIL-K-6046 is used to produce a coded signal.

(3) Hazard beacons will be the same as the identification beacon, above, except that it will be equipped with two red filters, Item No.269, conforming to Mil. Spec. MIL-L-6273 in lieu of the green filters. A type D-1 flasher will be used to produce the periodic flashes.

## 7-6. Obstruction lights

Obstruction lights will be as indicated in FAA Advisory Circular AC 70/7460-1, Obstruction Marking and Lighting.

## 7-7. Visual glide slope indicators

The use of glide slope or approach angle indicators at an Army fixed wing airfield or heliport/heliport is not mandatory for non-instrument and non-precision instrument operations. Indicators will be installed only where specifically authorized or where required for precision instrument, category I operations (table 5-1). Where indicators are authorized for fixed wing airfield, the four box PAP! will be used. Installation will be in accordance with FAA Advisory Circular AC 150/5345-28. Where indicators are authorized for heliports, the four box PAPI or the two box CHAPI may be used. Where authorized for helipads, the two box CHAPI will be used. Visual glide slope indicators will be controlled independently of any other lighting system. When a four box PAP! is installed, the inner two boxes will be fed separately from the outer two boxes. Separate feeds will allow two box operation simulating a visual approach slope indicator (VASI) system when one circuit fails.