

AC NO: 170/6850-1

DATE: 8/28/68



ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

SUBJECT: AERONAUTICAL BEACONS AND TRUE LIGHTS

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1. PURPOSE. This circular describes the Federal Aviation Administration (FAA) standards for the installation and operation of aeronautical beacons serving as true lights.
 2. CANCELLATION. This circular cancels the following:
 - a. Technical Standard Order No. TSO-N19, "Criteria for Certification and Lawful Authority to Operate a True Light," dated June 14, 1951.
 - b. Technical Standard Order No. TSO-N21, "Approval Procedure for True Light Components," dated September 14, 1951.
 - c. Technical Standard Order No. TSO-N7c, "Aeronautical Beacons," dated August 1, 1961, and associated "National Standards for Aeronautical Beacons," AGA-NS6.
 3. REFERENCES.
 - a. Federal Aviation Act of 1958, as amended, Section 902(c).
 - b. Federal Aviation Administration Advisory Circular AC 70/7460-1, "Obstruction Marking and Lighting."
 - c. Federal Aviation Regulations, Part 77, "Objects Affecting Navigable Airspace," (14 CFR 77).
 - d. Advisory Circular 150/5345-12A, Specifications for L-801 Beacon.
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Initiated by: AT-240

4. DEFINITIONS:

- a. True Lights. For the purpose of this circular a true light is any rotating or flashing illuminated aeronautical beacon or combination of such beacons which is established, maintained, exhibited or operated as an aid to air navigation, and which meets the minimum physical and operational standards set forth in paragraph 6, Standards for Aeronautical Beacons.
- b. Aeronautical Beacons. Aeronautical beacons serving as true lights are classified as follows:
 - (1) Airport beacons which mark areas of land or water used or intended to be used for the landing and takeoff of aircraft.
 - (2) Hazard beacons which mark the presence of obstructions to air navigation (Subpart C, Part 77, FAR) and objects of greater height than 200 feet above site level.
 - (3) Landmark beacons which mark prominent natural terrain features or artificial structures (includes those beacons which formerly identified Federal airways).
- c. Lighted Airport. An airport where adequate boundary and/or runway lights and associated obstruction lights are in operation nightly from sunset to sunrise, or where adequate means are provided during any period of extinguishment to assure immediate operation of such lights, or where such lights are not operated during scheduled periods in accordance with paragraph 6f(2).
- d. Unlighted Airport. An airport where adequate boundary and/or runway lights and associated obstruction lights are not installed, or where such lights are installed but not in operation nightly from sunset to sunrise and there are no adequate means provided to assure immediate operation of such lights during any period of extinguishment.

5. DISCUSSION. The Air Commerce Act of 1926 established the category of true lights and made it unlawful to operate such a light unless lawful authority was obtained. The penalties for the operation or discontinuance of the operation of a true light without proper authorization provided in the Air Commerce Act were carried forward by the Civil Aeronautics Act of 1938. The Civil Aeronautics Administration issued Technical Standard Order TSO-N19, "Criteria for Certification and Lawful Authority to Operate a True Light," to provide uniform criteria for the certification and grant of lawful authority for the operation of a true light.

The Federal Aviation Act of 1958 repealed all remnants of the Air Commerce Act and the Civil Aeronautics Act. The Act of 1958 thereby eliminated the specific requirement that lawful authority be obtained for the operation of a true light. However, it retained penalties for the exhibition, with the intent to interfere with air navigation within the United States, of any light that may be mistaken for a true light established pursuant to the Act or in connection with an airport or other navigation facility. Penalties were also provided for the knowing removal, extinguishment or interference with the operation of any true light.

Section 902(c) of the Federal Aviation Act of 1958 establishes the penalty for any person who, with the intent to interfere with air navigation within the United States, exhibits any light that may be mistaken for a true light established pursuant to the Act or in connection with an airport or other air navigation facility; or after due warning from the Administrator, continues to maintain any misleading light or signal; or knowingly removes, extinguishes, or interferes with the operation of any true light or signal. In the event a person continues to operate a light, after warning from the Administrator that it is misleading to airmen, the Administrator may initiate appropriate legal action to have the penalties provided by the Act invoked.

6. STANDARDS FOR AERONAUTICAL BEACONS. An aeronautical beacon produces a distinctive signal and is so located that it clearly indicates the facility, obstruction, or landmark its characteristic identifies.
- a. Basic Signals. Aeronautical beacons present the following basic signals:
- (1) Alternate white and green flashes indicate a lighted land airport. The white flash is double peaked at military airports.
 - (2) Alternate white and yellow flashes indicate a lighted water airport. The white flash is double peaked at military airports.
 - (3) White flashes indicate an unlighted airport.
 - (4) Alternate white and red flashes or white flashes accompanied by coded red flashes indicate a landmark.
 - (5) Red flashes indicate an obstruction.
 - (6) Where an airport identification beacon is necessary, as in 6d(1)(b), the color of the flash is green for land airports, yellow for water airports, and white for unlighted airports. The identification beacon may be coded if desired.

b. Flashing Rate. The total flashes are:

- (1) 12 to 15 per minute for airport and landmark beacons.
- (2) In accordance with the standards in Federal Aviation Administration Advisory Circular AC 70/7460-1, "Obstruction Marking and Lighting," for hazard beacons.
- (3) Not over 40 flashes or character elements per minute for identification code beacons.
 - (a) The coded signal emitted by airport identification beacons does not consist of more than two letters. The coding device on such beacons is adjusted, insofar as possible, to the following timing:

Duration of dot 0.5 second

Duration of dash 1.5 second

Duration of eclipse - 0.5 second between dots and dashes
of a particular letter

Duration of eclipse - 1.5 seconds between letters and
repetition of single letter
characteristics

Duration of eclipse - 2.0 seconds between characteristics
which contain two letters

c. Effective Intensity. The effective intensity of a flash of a beacon is:

- (1) Computed from the relation

$$I_e = \frac{\int_{t_1}^{t_2} I dt}{0.2 + t_2 - t_1}$$

where I_e is the effective intensity

I is the instantaneous intensity, and

t_1 and t_2 are the times in seconds of the beginning and end of that part of the flash when the value of I exceeds I_e . This choice of times t_1 and t_2 maximizes the values of I_e .

- (2) At all azimuth angles, not less than 14,000 candelas for white light and 2,100 candelas for colored light at angles of elevation above the horizontal between one and three degrees for airport and landmark beacons.
- (3) At all azimuth angles, not less than 1,000 candelas (of aviation white or colored light appropriate to the service involved) at angles of elevation between one and three degrees for identification beacons.

d. Location:

- (1) Airport beacons are so located:
 - (a) That they are not closer than 750 feet to the centerline or centerline extended of the nearest runway, except at airports having a maximum runway length of 3,200 feet the beacon may be located not closer than 350 feet to the centerline or centerline extended of the main runway; and
 - (b) That they are not more than 5,000 feet from the nearest point of the usable landing area except in cases where surrounding terrain will unduly restrict the visibility of the beacon. In which case this distance may be increased to a maximum of 2 miles from the nearest point of the usable landing area, provided an identification beacon is installed on the airport as near as practicable to the appropriate inner limits expressed in (a) above.
 - (c) As to minimize dazzle to pilots approaching to land and to airport traffic control personnel.
- (2) Landmark beacons are mounted on the highest point of the natural feature or artificial structure that they serve to identify.
- (3) Hazard beacons are mounted in the manner described in Federal Aviation Administration Advisory Circular AC 70/7460-1, "Obstruction Marking and Lighting."

e. Operation:

- (1) Aeronautical beacons are operated at all times when the sun's disk is more than six degrees below the horizon (sunset to sunrise).
- (2) Aeronautical beacons may be operated during periods of restricted visibility or ceiling at times other than provided for in (1) above.

f. Deviations:

- (1) Change from the standards described in 6a and 6b should not be made since non-uniformity detracts from the single impression which such lights should give to pilots.
- (2) Change from the provision of paragraph 6e(1) is acceptable for airport beacons at airports where adequate boundary and/or runway lights are not available during scheduled periods provided that such scheduled periods are publicized by NOTAM.
- (3) Change from the standards other than those specified in (1) and (2) above should be coordinated with the Director, Air Traffic Service since lights serve airmen only if they can be correctly interpreted.
- (4) With respect to paragraph 6c of this circular, an airport type rotating beacon conforming to Advisory Circular 150/5345-12A, Specifications for L-801 Beacon, is acceptable for use where a medium intensity lighting system is operated.

7. HOW TO OBTAIN THIS CIRCULAR. Obtain additional copies of this circular, AC 170/6850-1, Aeronautical Beacons and True Lights, from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D. C. 20590.

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