



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Acceptable Methods,
Techniques, and Practices – Aircraft
Alterations

Date: 3/3/08
Initiated by: AFS-300

AC No: 43.13-2B

1. PURPOSE. This advisory circular (AC) contains methods, techniques, and practices acceptable to the Administrator for the inspection and alteration on non-pressurized areas of civil aircraft of 12,500 lbs gross weight or less. This AC is for use by mechanics, repair stations, and other certificated entities. This data generally pertains to minor alterations; however, the alteration data herein may be used as approved data for major alterations when the AC chapter, page, and paragraph are listed in block 8 of FAA Form 337 when the user has determined that it is:

- a. Appropriate to the product being altered,
- b. Directly applicable to the alteration being made, and
- c. Not contrary to manufacturer's data.

2. CANCELLATION. AC 43.13-2A, Acceptable Methods, Techniques, and Practices—Aircraft Alterations, dated January 1, 1977, is canceled.

3. REFERENCE. Title 14 of the Code of Federal Regulations (14 CFR) part 43, § 43.13(a) states that each person performing maintenance, alteration, or preventive maintenance on an aircraft, engine, propeller, or appliance must use the methods, techniques, and practices prescribed in the current manufacturer's maintenance manual or Instructions for Continued Airworthiness prepared by its manufacturer, or other methods, techniques, or practices acceptable to the Administrator, except as noted in § 43.16. FAA inspectors are prepared to answer questions that may arise in this regard. Persons engaged in the inspection and alteration of civil aircraft should be familiar with 14 CFR part 43, Maintenance, Preventive Maintenance, Rebuilding, and Alterations, and part 65, subparts A, D, and E of Certification: Airmen Other than Flight Crewmembers, and applicable airworthiness requirements under which the aircraft was type-certificated.

4. COMMENTS INVITED. Comments regarding this AC should be directed to DOT/FAA: ATTN: Aircraft Maintenance Division, 800 Independence Ave., SW., Washington, DC 20591, FAX (202) 267-5115.

ORIGINAL SIGNED By

James J. Ballough
Director Flight Standards Service

CHAPTER 4. ANTICOLLISION AND SUPPLEMENTARY LIGHT INSTALLATION

400. PURPOSE. This chapter gives procedures and standards to be used when replacing older rotating beacon assemblies and wing lights with strobe or other anticollision systems. This chapter assumes that the newer units have FAA approval in the form of a Parts Manufacturer Approval (PMA) or Technical Standard Order (TSO), and not an experimental or aviation unit.

401. HAZARDS AND WARNINGS. When installing anticollision lights take care to ensure the unit is properly grounded, the airframe structure can support the new unit, and the aircraft wiring is of the correct size. Mechanics should take special precautions to protect their eyes when testing the new unit. Strobe lights are especially hazardous in dark or darken hangars when activated.

402. REGULATIONS AND OTHER REFERENCES. The requirements for anticollision lights are included in Title 14 of the Code of Federal Regulations (14 CFR) part 23, § 23.1401 and part 27, § 27.1401 for non-transport category aircraft. For part 23 aircraft certificated after March 11, 1996, § 91.205 are required to have an anticollision light. The night VFR requirements for part 23 certificated on or before August 11, 1971, must have an approved white or red anticollision light. Aircraft for which an application for type certificate was made before April 1, 1957, may conform either to the above regulations or to the following standards: Additional information can be found in AC 20-74.

a. Civil Aviation Regulation (CAR) 6, Rotorcraft Airworthiness; Normal Category.

b. Anticollision lights (when installed) should be installed on top of the fuselage or tail in such a location that the light will not impair the flight crewmembers' vision and will not detract from the conspicuity of the position lights. If there is no

acceptable location on top of the fuselage or tail, a bottom fuselage or wing tip installation may be used.

c. The color of the anticollision light must be either aviation red or aviation white in accordance with the specifications of § 23.1397 or § 27.1397, as applicable.

d. The arrangement of the anticollision light system, (i.e., number of light sources, beam width, speed of rotation and other characteristics, etc.) must give an effective flash frequency of not less than 40, nor more than 100, cycles per minute. The effective flash frequency is the frequency at which the aircraft's complete anticollision light system is observed from a distance, and applies to each sector of light including any overlaps that exist when the system consists of more than one light source. In overlaps, flash frequencies may exceed 100 but not more than 180 cycles per minute.

e. The system must consist of enough lights to illuminate the vital areas around the aircraft, considering the physical configuration and flight characteristics of the aircraft. The field of coverage must extend in each direction within at least 75 degrees above and 75 degrees below the horizontal plane of the aircraft. The minimum light intensity and minimum effective intensities are given in §§ 23.1401 and 27.1401 respectively.

f. Supplementary lights may be installed in addition to position and anticollision lights required by applicable regulations; provided that, the required position and anticollision lights are continuously visible and unmistakably recognizable and their conspicuity is not degraded by such supplementary lights.

403. OPERATIONAL CONSIDERATIONS: CREW VISION. Partial masking of the anticollision light may be necessary to prevent direct

or reflected light rays from any anticollision or supplementary light from interfering with crew vision. Determine if the field of coverage requirements are met. An acceptable method of preventing light reflection from propeller disc, nacelle, or wing surface is an application of nonreflective paint on surfaces which present a reflection problem. Perform a night flight-check to assure that any objectionable light reflection, sometimes known as flicker vertigo, has been eliminated. Enter a notation to that effect in the aircraft records.

404. INSTALLATION CONSIDERATIONS.

a. Communication and Navigation. Assure that the installation and operation of any anticollision/supplementary light does not interfere with the performance of installed communication or navigation equipment. Capacitor discharge light (strobe) systems may generate radio frequency interference (RFI). This radiated interference can be induced into the audio circuits of communication or navigation systems and is noticeable by audible clicks in the speaker or headphones. The magnitude of the RFI disturbance does not usually disrupt the intelligence of audio reception.

b. Precautions. RFI can be reduced or eliminated by observing the following precautions during installation of capacitor discharge light systems:

(1) Locate the power supply at least 3 feet from any antenna, especially antennas for radio systems that operate in the lower frequency bands.

(2) Assure that the lamp unit (flash tube) wires are separated from other aircraft wiring

placing particular emphasis on coaxial cables and radio equipment input power wires.

(3) Make sure that the power supply case is adequately bonded to the airframe.

(4) Ground the shield around the interconnecting wires between the lamp unit and power supply at the power supply end only.

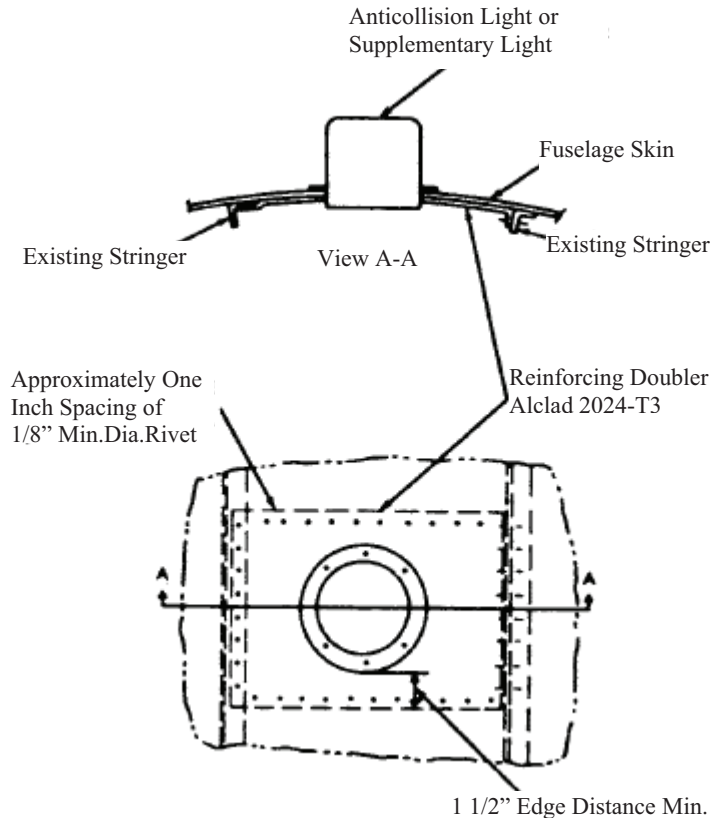
405. MARKINGS AND PLACARDS. Identify each switch for an anticollision/supplementary light and indicate its operation. The aircraft should be flight tested under haze, overcast, and visible moisture conditions to ascertain that no interference to pilot vision is produced by operation of these lights. If found unsatisfactory by test or in the absence of such testing, a placard should be provided to the pilot stating that the appropriate lights be turned off while operating in these conditions.

406. ELECTRICAL INSTALLATION. Install an individual switch for the anticollision light or supplementary light system that is independent of the position light system switch. Data for the installation of wiring, protection device, and generator/alternator limitations is contained in Advisory Circular (AC) 43.13-1B Acceptable Methods, Techniques, and Practices-Aircraft Inspection and Repair, (as amended) chapter 11. Assure that the terminal voltage at each light is within the limits as prescribed by the manufacturer.

407. ALTERATION OF STRUCTURE.

a. The simplest light installation is to secure the light to a reinforced fuselage skin panel. The reinforcement doubler shall be of equivalent thickness, material, and strength as the existing skin. (Install as shown in Figure 4-1.)

FIGURE 4-1. TYPICAL ANTICOLLISION OR SUPPLEMENTARY LIGHT INSTALLATION IN A SKIN PANEL (UNPRESSURIZED)



b. When a formed angle stringer is cut and partially removed, position the reinforcement doubler between the skin and the frame. The doubler is to be equivalent to the stringer in thickness and extend lengthwise beyond the adjacent fuselage frames. The distance between the light and the edge of the doubler is to be twice the height of the doubler flange. (See Figure 4-2 for typical installation.)

c. Engineering evaluation is required for installations involving the cutting of complex formed or extruded stiffeners, fuselage frames, or pressurized skin of pressurized aircraft.

d. Vertical stabilizer installations may be

made on aircraft if the stabilizer is large enough in cross section to accommodate the light installation, and if aircraft flutter and vibration characteristics are not adversely affected. Locate such an installation near a spar, and add formers as required to stiffen the structure near the light. (A typical installation is shown in Figure 4-3.)

e. Rudder installations are not recommended because of the possible structural difficulties. However, if such installations are considered, a FAA engineering evaluation to determine whether the added mass of the light installation will adversely affect the flutter and vibration characteristics of the tail surfaces must be made.

FIGURE 4-2. TYPICAL ANTICOLLISION OR SUPPLEMENTARY LIGHT INSTALLATION INVOLVING A CUT STRINGER (UNPRESSURIZED)

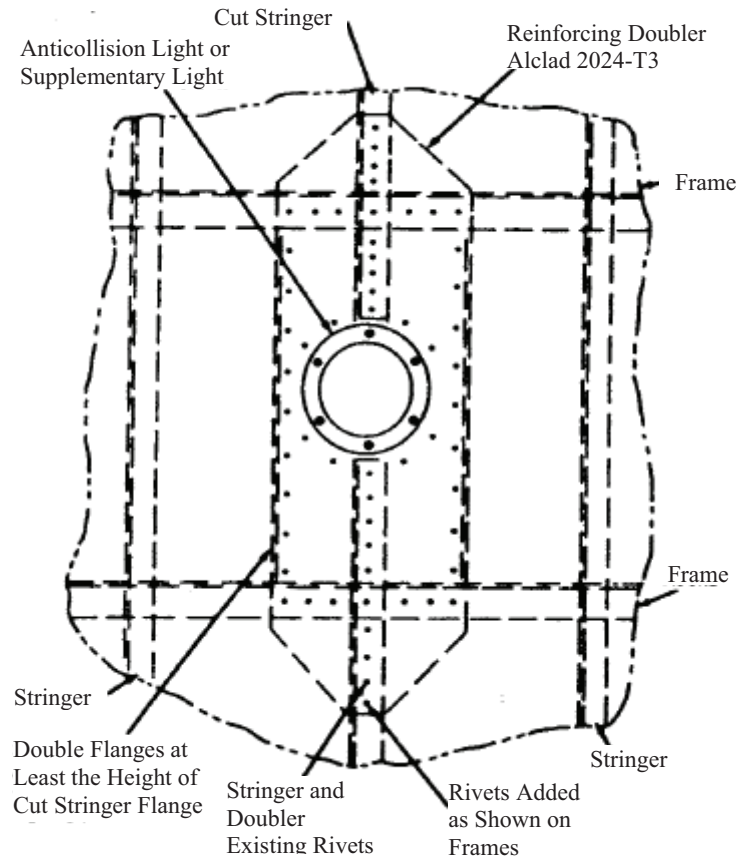
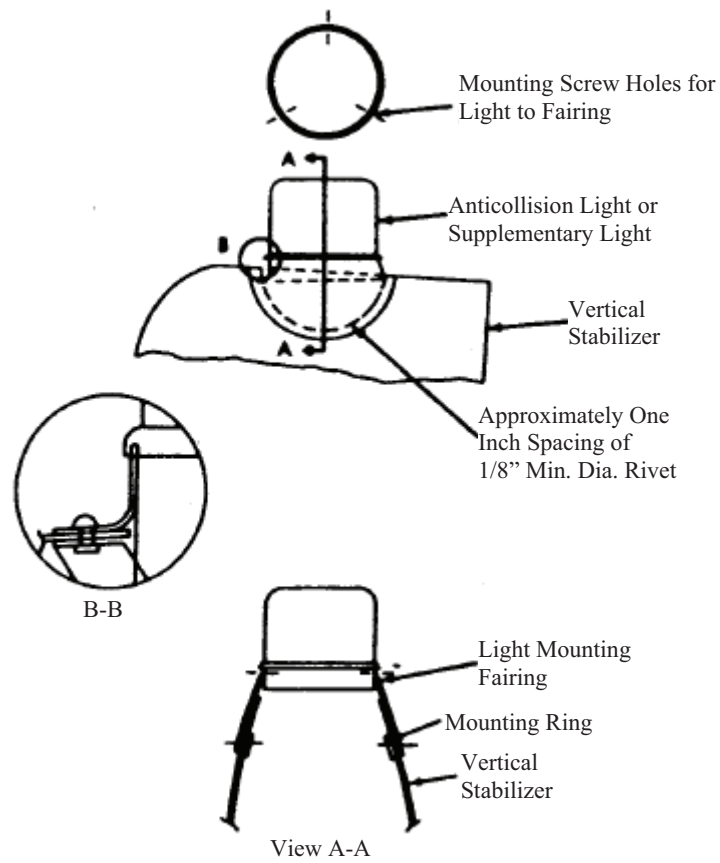


FIGURE 4-3. TYPICAL ANTICOLLISION OR SUPPLEMENTARY LIGHT INSTALLATION IN A FIN TIP



NOTE: Skin thickness of mounting ring and fairing are at least equivalent.