



Advisory Circular

Subject:

Date: 9/30/94

AC No: 121- 31

Initiated by: AFS-220

Change:

Flightcrew Sleeping Quarters
and Rest Facilities

1. PURPOSE. This advisory circular (AC) provides methods acceptable to the Administrator for Federal Aviation Regulations (FAR) Part 121 certificate holders who conduct flag and supplemental operations to obtain a Federal Aviation Administration (FAA) finding regarding the adequacy of onboard sleeping quarters for compliance with FAR Sections 121.485(a) and 121.523(b). If, in addition to providing sleeping quarters, an operator voluntarily provides an area for storing personal articles and for changing clothing, then this AC provides useful information and advice for their design and installation. These sleeping quarters and rest facilities would be used by flight crewmembers to obtain sleep of adequate quality during flights scheduled for more than 12 hours during any 24-consecutive hours. Sleep of adequate quality and duration is needed during long-range flights to reduce sleepiness and improve flight crewmember performance during critical phases of flight. Additionally, this AC references FAA acceptable criteria which may be used for the design and installation of flightcrew sleeping quarters and rest facilities on commercial transport aircraft capable of long-range operations with augmented or enlarged flightcrew complements.

2. RELATED FAR SECTIONS.

a. Part 25, Subpart D - Design and Construction.
Sections 25.791 and 25.853.

b. Part 121, Subpart J - Special Airworthiness Requirements. Section 121.285.

c. Part 121, Subpart K - Instrument and Equipment Requirements. Sections 121.311(b), 121.317, and 121.327-329.

d. Part 121, Subpart R - Flight Time Limitations: Flag Air Carriers. Section 121.485(a).

e. Part 121, Subpart S - Flight Time Limitations: Supplemental Air Carriers and Commercial Operators. Section 121.523(b).

3. RELATED READING MATERIAL. This AC and Society of Automotive Engineers (SAE) Aerospace Recommended Practice (ARP) 4101/3, Crew Rest Facilities, should be used in conjunction with ARP4101, Flight Deck Layout and Facilities, for the design and installation of flightcrew sleeping quarters and rest facilities. The following SAE documents may also be applicable and may be obtained for a fee from:

The Engineering Society for Advancing
Mobility Land, Sea, Air, and Space International
400 Commonwealth Drive
Warrendale, PA 15096-0001

a. SAE ARP1323, Type Measurements of Aircraft Interior Sound Pressure Levels During Cruise.

b. SAE ARP4245, Quantities for Description of the Acoustical Environment in the Interior of the Aircraft.

4. DEFINITIONS. For purposes of this document, these terms are defined as follows:

a. Flightcrew Rest Facilities. An area designed for the purpose of obtaining sleep, stowing personal articles, and changing clothes in privacy for off-duty flightcrew. Flightcrew sleeping quarters may be an integral part of a flightcrew rest facility.

b. Flightcrew Sleeping Quarters. Any area designated for the purpose of obtaining sleep in an isolated space with a horizontal sleeping surface for off-duty flightcrew.

c. Sleeping Surface. Any horizontal surface such as a bed or bunk that meets the guidelines referenced in this AC.

d. Free Space. An area designated for the use of the crew to change and stow clothing.

5. OPERATIONAL CONSIDERATIONS.

a. Flightcrew Sleeping Quarters and Rest Facilities. The location of flightcrew sleeping quarters or rest facilities in an aircraft is an important decision that should be based on

an analysis of the following factors to ensure that adequate environment is provided to enable flight crewmembers to obtain sleep of adequate quality.

(1) There should be a sufficient number of sleeping surfaces provided to accommodate the maximum number of flight crewmembers that would be expected to use these surfaces during the same period of time.

(2) For flightcrew sleeping quarters, adequate volume should be provided for sleeping. The recommended sleeping space volume per individual is 1.0m^3 (35 feet³).

(3) For flightcrew rest facilities, adequate volume should be provided for sleeping, personal articles storage, and changing of clothes. The following volumes are recommended:

(i) Individual sleeping space volume: 1.0m^3 (35 feet³).

(ii) Free space adjacent to the sleeping surfaces for ingress and egress and changing of clothes: 1.85m^3 (65 feet³).

b. Sleeping Surfaces. The following are acceptable criteria for sleeping surfaces:

(1) Dimensions for each sleeping surface of $1.98 \times 0.76\text{m}$ (78 x 30 inches).

(2) The sleeping surfaces should be designed so that they are as level as practicable during cruise flight.

(3) Suitable means should be provided to ensure occupant privacy for each sleeping surface area, e.g., curtains in an over-and-under arrangement or a divider curtain in a side-by-side arrangement.

c. Isolation. The flightcrew rest facility or flightcrew sleeping quarters should be in a location where intrusive noise, odors, and vibration have minimum affect on sleep. The spectrum of the sound within these areas should be limited to broadband without annoying tones. Special attention should be given to the existence of doors, passenger convenience systems, public address systems, etc., in the immediate area to minimize intrusive noise. A noise level during cruise flight in the range of 70 to 75 dB(A) is considered a reasonable design objective.

d. Environmental. Airflow and temperature control should provide a uniformly well-ventilated atmosphere free from drafts, cold spots, and temperature gradient. The FAA recommends that the sleeping surface area be designated a nonsmoking area.

e. Public Address System. The FAA recommends that the public address system or an alternative means should include provisions to provide only relevant information to flight crewmembers in the flightcrew rest facility (e.g., fire in flight, aircraft depressurization, preparation of compartment occupants for landing, etc.).

f. Emergency Lighting. Emergency lighting should be provided in flightcrew rest facilities.

g. Stowage and Restraints. In accordance with the applicable FAR, suitable personal articles stowage and occupant restraint systems must be provided to each occupant of sleeping surfaces as well as each occupant of any seats located in flightcrew rest facilities.

h. Emergency and Other Equipment.

(1) Approved oxygen equipment must be provided for each crewmember who uses a sleeping surface and flightcrew rest facility seat.

(2) There should be one or more lighted "FASTEN SEAT BELTS" signs within the view of the occupants of each sleeping surface and seat located within a flightcrew rest facility.

(3) If the operating rules and the operator permit smoking in a flightcrew rest facility, the following apply:

(i) One or more lighted "NO SMOKING" signs within the view of the occupants of each sleeping surface and seat located in the facility should be provided; and

(ii) An adequate number of self-contained, removable ashtrays for each seat in the facility must be provided.

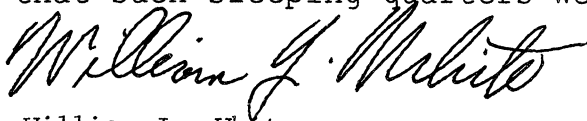
(4) If the operating rules and the operator do not permit smoking in a flightcrew rest facility, then one or more "NO SMOKING" placards legible to the occupants of each sleeping surface and seat located in the facility should be provided.

6. REQUEST FOR ADEQUACY DETERMINATION FINDING. If the operator wants a formal FAA determination on the adequacy of flightcrew sleeping quarters and flightcrew rest facility installations, such requests should be forwarded to the following address:

Federal Aviation Administration
ATTN: Aircraft Evaluation Program Staff, AFS-60
800 Independence Avenue, SW.
Washington, DC 20591

a. These requests will then be forwarded to the appropriate aircraft evaluation group by AFS-60 for evaluation and decision regarding whether or not to issue a finding that proposed installations are adequate for their intended function under FAR Sections 121.485(a) and 121.523(b).

b. Operators can have their crewmembers use sleeping quarters without a formal FAA adequacy determination. However, enforcement action may be taken if the FAA later determines that such sleeping quarters were inadequate.



William J. White
Deputy Director
Flight Standards Service

