

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98057-3356

In the matter of the petition of BaySys Technologies For an exemption from §§ 25.562(c)(2)-(c)(4) and (c)(6), 25.785(b), 25.785(h)(2), 25.785(j), 25.807(d)(7), 25.813(e) and 25.853(c) of Title 14, Code of Federal Aviation Regulations	Regulatory Docket Nos. FAA-2008-0104 FAA-2008-0210 FAA-2008-0531
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PARTIAL GRANT OF EXEMPTION

By letters dated January 19th, February 18th, and May 1st, 2008, Nick Olmsted, Director of Certification for BaySys Technologies, 24233 Lankford Highway, Accomac, VA, 23301, petitioned the Federal Aviation Administration for an exemption from §§ 25.562(c)(2) through (c)(4) and (c)(6); 25.785(b); 25.785(h)(2); 25.785(j); 25.807(d)(7); 25.813(e); and 25.853(c) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit installation of an executive interior on an Airbus A340-200 Model airplane which will operate as a private use (i.e., not-for-hire, not-for-common-carriage) airplane.

The petitioner requests relief from the following regulations:

Section 25.562(b), Amendment 25-64 states:

(b) Each seat type design approved for crew or passenger occupancy during takeoff and landing must successfully complete dynamic tests or be demonstrated by rational analysis based on dynamic tests of a similar type seat, in accordance with each of the following emergency landing conditions. The tests must be conducted with an occupant simulated by a 170-pound anthropomorphic test dummy, as defined by 49 CFR part 572, Subpart B, or its equivalent, sitting in the normal upright position.

- (1) A change in downward vertical velocity (Δv) of not less than 35 feet per second, with the airplane's longitudinal axis canted downward 30 degrees with respect to the horizontal plane and with the wings level. Peak floor deceleration must occur in not more than 0.08 seconds after impact and must reach a minimum of 14g.

(2) A change in forward longitudinal velocity (Δv) of not less than 44 feet per second, with the airplane's longitudinal axis horizontal and yawed 10 degrees either right or left, whichever would cause the greatest likelihood of the upper torso restraint system (where installed) moving off the occupant's shoulder, and with the wings level. Peak floor deceleration must occur in not more than 0.09 seconds after impact and must reach a minimum of 16g. Where floor rails or floor fittings are used to attach the seating devices to the test fixture, the rails or fittings must be misaligned with respect to the adjacent set of rails or fittings by at least 10 degrees vertically (i.e., out of parallel) with one rolled 10 degrees.

Section 25.562(c)(2) through (c)(4) and (c)(6), Amendment 25-64 states:

(c) The following performance measures must not be exceeded during the dynamic tests conducted in accordance with paragraph (b) of this section.

...

(2) The maximum compressive load measured between the pelvis and the lumbar column of the anthropomorphic dummy must not exceed 1,500 pounds.

(3) The upper torso restraint straps (where installed) must remain on the occupant's shoulder during the impact.

(4) The lap safety belt must remain on the occupant's pelvis during the impact.

...

(6) Where leg injuries may result from contact with seats or other structure, protection must be provided to prevent axially compressive loads exceeding 2,250 pounds in each femur.

Section 25.785(b), Amendment 25-72 requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing be designed so that a person making proper use of these facilities will not suffer serious injury in an emergency landing as a result of the inertia forces specified in §§ 25.561 and 25.562.

Section 25.785(h)(2), Amendment 25-72 states:

(h) Each seat located in the passenger compartment and designated for use during taxi, takeoff and landing by a flight attendant required by the operating rules of this chapter must be:

...

(2) To the extent possible, without compromising proximity to a required floor-level emergency exit, located to provide a direct view of the cabin area for which the flight attendant is responsible.

Section 25.785(j), Amendment 25-72 states:

(j) If the seatbacks do not provide a firm handhold, there must be a handgrip or rail along each aisle to enable persons to steady themselves while using the aisles in moderately rough air.

Section 25.807(d)(7), Amendment 25-72 states:

(d) Passenger emergency exits. Except as provided in paragraphs (d)(3) through (7) of this section, the minimum number and type of passenger emergency exits is as follows:

(6) For an airplane that is required to have more than one passenger emergency exit for each side of the fuselage, no passenger emergency exit shall be more than 60 feet from any adjacent passenger emergency exit on the same deck of the fuselage, as measured parallel to the airplane's longitudinal axis between the nearest exit edge.

Section 25.813(e), Amendment 25-76 states:

(e) No door may be installed in any partition between passenger compartments.

Section 25.853(c), Amendment 25-72 requires:

That interior components and materials meet certain flammability measures for heat release and smoke toxicity.

Related sections of 14 CFR

Section 25.561(b), Amendment 25-64, Emergency Landing Conditions, General, states:

- (b) The structure must be designed to give each occupant every reasonable chance of escaping serious injury in a minor crash landing when
- (1) Proper use is made of seats, belts, and all other safety design provisions;
 - (2) The wheels are retracted (where applicable); and
 - (3) The occupant experiences the following ultimate inertia forces acting separately relative to the surrounding structure: (i) Upward, 3.0g; (ii) Forward, 9.0g; (iii) Sideward, 3.0g on the airframe; and 4.0g on the seats and their attachments; (iv) Downward, 6.0g; (v) Rearward, 1.5g.

The petitioner supports its request with the following information:

BaySys Technologies seeks exemption from the regulations listed above for an Airbus Model A340-200 airplane having serial number MSN 204. This airplane will be operated in private use. The petitioner seeks exemption from the cited regulations in order to install an executive interior in the airplane. The following information summarizes the petitions submitted by BaySys Technologies. The complete petitions are available on the Internet at <http://regulations.gov>.¹ The docket numbers are FAA-2008-0104, FAA-2008-0210, and FAA-2008-0531.

¹ Click on Advanced Docket Search; In Docket ID, enter FAA-2008-XXXX and click on "Submit."

1. In support of exemption from § 25.785(h)(2), the petitioner states the following:
 - a) The proposed interior arrangement offers proper consideration to the flight attendants' responsibilities without compromising proximity to the required emergency exits or direct viewing of the majority of the cabin occupants.
 - b) The arrangement provides a measure of safety equivalent to that intended by the regulation since the small number of passengers combined with the largely open seating arrangement provides an improved level of passenger awareness which results in increased flight attendant awareness.
 - c) Although some seated passengers may not be observable by any flight attendant, each is in easy voice contact with at least one flight attendant.
 - d) The degree of viewing and the level of familiarity with the airplane and its occupants by the flight attendant crew will be greater than if the airplane were operated in "an air carrier configuration."

2. In support of exemption from § 25.785(j), the petitioner states the following:
 - a) The requirement for firm handholds along the aisles cannot be met for certain specific areas in the passenger cabin due to the wide cabin, the open spaces between individual seats, and the ability to recline the seats.
 - b) The risk for occupants due to the lack of readily accessible firm handholds in certain areas is acceptable because of mitigation steps undertaken in the design of the passenger cabin; for example, passageways and doorframes integrated into the cabin layout will provide means for passengers to stabilize themselves during turbulence.
 - c) Passengers will be instructed to remain seated with their seat belts fastened in case of turbulence during flight.

3. In support of exemption from § 25.813(e), the petitioner states that its proposed design measures, features, and analysis would result in a level of safety equivalent to § 25.813(d) through (f). Some examples of such design measures and features are the following:
 - a) Each door between passenger compartments will have dual means to retain it in the open position.
 - b) If a door is on an egress route, there will be a means to signal to the flightcrew when the door is closed.
 - c) No door will be installed in a compartment such that persons other than occupants of the compartment would have to pass through that door to reach an emergency exit.
 - d) Each door between passenger compartments will be frangible.

4. In support of exemption from § 25.807(d)(7), the petitioner states the following:
 - a) There is concern that the distance between exits creates a safety problem in managing an evacuation when passengers queue in the left aisle of the airplane in the forward VIP section due to longer distances between exits. However, with the greatly reduced number of passengers on the airplane, the passenger queue will be much shorter than that on an equivalent commercial airplane.

b) The forward section of the airplane has a limited number of seats. Only fourteen seats are affected by closing the single R2 door, and there is an exit door within 30 feet of the furthest seat.

c) In addition, the petitioner proposes a design analysis to show that the design would result in a level of safety equivalent to that prescribed by § 25.807(d)(7).

5. In support of exemption from § 25.853(c), the petitioner states that the requirements of § 25.853(c) are driven by a need for sufficient time to evacuate the airplane in case of emergency. That regulation specifies a limit of 90 seconds. However, the petitioner proposes an evacuation time of 45 seconds which, combined with a favorable service factor, would mean an acceptable emergency evacuation.

6. In support of exemption from § 25.562(c)(2) through (c)(4) and (c)(6), the petitioner states the following:

a) “We believe that exemption from § 25.562(c)(2), (4) and (6) [sic] with retention of some head strike requirement such as § 25.562(c)(5) is appropriate for an airplane having the special purpose discussed herein and offers an acceptable level of safety for the most severe type of injury commonly experienced where occupant death occurs.”

b) “Of the injury criteria covered in § 25.562(c)(2) through (c)(6), we feel the single most critical is the Head Injury Criterion (HIC) addressed in § 25.562(c)(2) because of the high potential for occupant death and that this criterion is one that can most practicably be dealt with given current design capability. Protection is provided via lap and shoulder restraint belts.”

7. In support of exemption from § 25.562(b), the petitioner states the following:

a) Operation will be limited to private use by an individual, company, or government and would not include public passenger or cargo-for-hire commercial service.

b) The maximum passenger capacity of an Airbus A340-200 is 379 and the proposed passenger load for this private use airplane is 80.

c) The flight and cabin crews would be familiar with the specific configuration of the airplane, including the locations of the emergency equipment and location of the emergency exits. This is not the case for commercial flights where many types of airplanes are used with various locations for the emergency equipment and exits.

d) The marketability for private use airplanes depends on the custom configuration and interiors selected by the customer.

e) The customer’s desired interior configuration would not accommodate 16g seats. Also, installing 16g seats would not be cost effective.

f) The general public would not be affected if this petition was granted.

g) The 20 seats in the Main Majlis should meet the requirements of § 25.561(b). Although these requirements are less than those provided in § 25.562(b), when considering the projected low usage of the airplane and the select group of passengers, an acceptable level of safety should be provided that does not degrade the safety of the general public.

h) The customer owns other private use airplanes with Majlis configurations that contain 9g seats, including side-facing seats.

The petitioner states that a grant of exemption is in the public interest for the following reasons:

- BaySys Technologies, LLC is a small and growing company which employs over 200 U.S. citizens and provides strong support to the local economies where its employees and facilities are located.
- Granting this exemption will avoid a significant loss of income that would have a negative impact on both the local and regional economies.
- Granting this exemption will enable the company to effectively compete in the global market for private use airplanes with interiors that meets customer requirements while providing an adequate level of safety for a restricted number of passengers.
- Improved financial performance of BaySys Technologies will mean increased local, state, and federal taxes and improvement of the country's balance of trade.

Federal Register publication

The FAA has determined that good cause exists for waiving the requirement for publication of a summary of the petition in the Federal Register for comment because the exemption, if granted, would not set a precedent, and any delay in acting on this petition would be detrimental to BaySys Technologies.

The FAA's analysis

The FAA considers that a Partial Grant of Exemption is in the public interest for the reasons stated by the petitioner and because the FAA is directed to take into account the type of operation when establishing standards under Title 49 of the United States Code (49 U.S.C. 44701(d)). (As stated below in our analysis of multiple-place, side-facing seats and of the seats in the Main Majlis, however, the FAA does not find that exemption from the requirements of § 25.562(c)(2) through (c)(4) and (c)(6) is in the public interest.)

As more and more transport category airplanes have been configured (or re-configured) for private use, the FAA has given considerable attention to the issue of appropriate regulation of such airplanes. Some of the current regulations governing design certification of transport category airplanes are not compatible with private use of such airplanes. Over the years, the aviation industry has asked the FAA to consider differentiating between the airworthiness requirements related to cabin interiors for different types of operation. Meanwhile, we have received a number of petitions to exempt transport category airplanes from certain regulations which are not compatible with private use of those airplanes. We have granted such exemptions on a case-by-case basis when we found that to do so was in the public interest and did not adversely affect the level of safety provided by the regulations.

In addition, last year the FAA published a notice of proposed rulemaking (NPRM), Notice No. 07-13, Special Requirements for Private Use Transport Category Airplanes (72 FR 38732, July 13, 2007). This proposal is intended to provide alternative criteria for transport category airplanes that are operated for private use while continuing to provide an acceptable level of safety for those operations. The petition submitted by BaySys Technologies

generally follows this proposed rule quite closely, and thus a Partial Grant of Exemption is in the public interest.

Our analysis of this petition considered each of the following design features proposed by the petitioner:

1. Multiple-place, side-facing seats.

Side-facing seats are considered a novel design for transport category airplanes that include Amendment 25-64 in their certification bases. Such seats were not anticipated when those airworthiness standards were issued. Therefore, the existing regulations do not provide adequate or appropriate safety standards for occupants of multiple-place, side-facing seats. The FAA has been conducting research to develop an acceptable method of compliance with § 25.785(b) for multiple-place, side-facing seat installations. Until the research is complete, criteria have been developed that provide adequate or appropriate safety standards for occupants of multiple-place, side-facing seat installations for airplanes in private use. These criteria are listed in the limitations section of this Partial Grant of Exemption under the heading “Side-facing seats, § 25.785(b).”

The petitioner also requested exemption from § 25.562(c)(2) through (c)(4) and (c)(6). The petitioner proposes that compliance with the head injury criterion of § 25.562(c)(5) is the most significant and is sufficient for a private use airplane. The FAA does not agree with this portion of the request. All of the current injury criteria in § 25.562 are feasible and readily met for side-facing seats. The main issue with side-facing seats is a lack of injury criteria specific to the sideward orientation. It is for that reason that the FAA has granted exemptions for private use airplanes in the past. The FAA has consistently applied the requirements of § 25.562(c)(2) through (c)(4) and (c)(6) to side-facing seats. This is consistent with other exemptions granted on this subject and in keeping with available technology. As stated above, all injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupants of side-facing seats.

2. Direct View.

The FAA has considered the requirement for direct view in the context of private use airplanes and agrees that much of the justification for the requirement is based on air carrier type operations. On a private use airplane, the practicality of locating flight attendant seats near emergency exits where there is also a direct view of occupants inside of rooms is questionable. In order to provide an adequate level of safety, flight attendant seats should be located so that there is a direct view provided for the cabin area that is practical. For example, flight attendant seats at the ends of the cabin should not face away from the cabin. In those areas of the airplane, however, where traditional seating arrangements are used, the FAA believes that direct view should be provided.

In considering the need for direct view, the FAA agrees that the restricted nature of the operation of a private use airplane mitigates much of the need. That is, the operator of an airplane in private use, unlike the operator of an airplane in commercial use, controls who flies on the airplane and how many are carried. The risk of passengers engaging in hazardous or malicious activity is essentially eliminated, and the need for direct view is

limited to those cases where a passenger may need assistance. We consider that this objective is met by requiring that a majority of flight attendants seats face the cabin.

3. Firm Handhold.

The FAA has considered the requirement for handholds in rooms in the context of private use airplanes. For the “VIP sections, Majlis and dining/conference areas,” the requirement to have a firm handhold would be impractical for the proposed configuration. The arrangement of the “VIP sections, Majlis and dining/conference areas” and the proposals that the petitioner has made produce a configuration that provides an acceptable level of safety.

4. Distance Between Exits, Exit Deactivation, and the 60 Foot Rule.

The intent of the 60 foot rule is to avoid excessive distances between passengers and their nearest exits, given the unpredictable conditions that can exist in an accident. For private use airplanes, the FAA agrees that placing restrictions on the way in which exit-to-exit distance can exceed 60 feet maintains the spirit of the requirement.

The specific criterion in Limitation No. 3, below, is taken from NPRM 07-13 and provides an adequate level of safety for passengers by limiting the number of passengers and the distance needed to travel to get to an exit. The distance criterion in Limitation No. 3 ensures that the intent of § 25.807(f)(4) is maintained, that is, that passengers not be seated more than 30 feet from the nearest exit. Given the increased complexity of private use cabin interiors, as allowed under this exemption, and the resulting increased potential for obstructions during emergency evacuation, the passenger capacity limits specified in paragraphs 3(b) and (c) are necessary to prevent crowding at obstructions and exits that would delay evacuation. Finally, paragraph 3(d), which limits the use of this allowance to one pair of exits on each side of the airplane, is necessary to ensure that the airplane as a whole retains an acceptable emergency exit arrangement.

5. Interior Doors.

When the regulations pertaining to interior doors were adopted, they considered two possible types of interior doors in a passenger compartment: An interior door between passenger compartments and an interior door between the passenger compartment and an exit.

Until recently, only the first type of door (between passenger compartments) was prohibited (see § 25.813(e)). However, part 25, as amended by Amendment 25-116, now also prohibits interior doors between an exit and the passenger compartment. In addition, Amendment 121-306 prohibits these doors in airplanes operated under 14 CFR part 121 that were manufactured after November 27, 2006. Amendments 25-116 and 121-306, titled “Miscellaneous Cabin Safety Changes,” were published in the Federal Register on October 27, 2004 (69 FR 62778).

In airplanes configured for private use, there are four different categories of doors in the passenger cabins. For all four categories, the room may be occupied during takeoff and landing.

Category 1. A door in a room that is less than the full width of the airplane. There will be an aisle on the outside of the room. Only the occupants of the room must use the door to reach an exit.

Category 2. A door in a room less than the full width of the airplane and the same as a Category 1 door, except there is a single emergency exit or pair of emergency exits within the room.

Category 3. A door or doors in a room that is the full width of the airplane. There are passengers seated on both sides of the door(s), and the main aisle leads out of or passes through the room. The room does not have any emergency exits.

Category 4. A door in a room the full width of the airplane and the same as a Category 3 door, except there is a pair of emergency exits at one end of the room.

Because not all interior doors between passenger compartments are equivalent, the FAA has determined that the following requirements will produce an adequate level of safety:

- a. In order to maintain an acceptable level of safety, doors in Categories 2, 3, or 4 installed across the main cabin aisle must open and close in a transverse direction. The direction of motion of the door must be at a right angle to the longitudinal axis of the airplane. This arrangement will tend to minimize the chance that the inertia forces of an accident could force the door closed. A “pocket door” is one example of such a design.
- b. Redundant means are necessary to latch doors open for takeoff and landing. Each latching means must be capable of retaining the door in the takeoff and landing position under the inertia forces of § 25.561.
- c. Each interior door must be frangible, in case it is jammed in the closed position in flight or during taxi, takeoff, or landing. Frangibility is intended to ensure that if a door is jammed closed, occupants can break it open and escape in either direction and emergency equipment can be moved. Frangibility may be demonstrated in either of the following ways:
 - A 5th percentile female can break through the door, creating a large enough opening that a 95th percentile (or larger) male can pass through. (See Advisory Circular 25-17, *Transport Airplane Cabin Interiors Crashworthiness Handbook*, paragraph 43b(2)).
 - A 5th percentile female can break a hinge on the door or a hinge on a smaller door within the door so that the door can swing enough to allow a 95th (or larger) percentile male to pass through the opening with the door swung open. This evaluation must be made with any cabin furnishing or equipment that could limit the swing arc of the door installed and then placed in the most adverse position. In using this approach, one must

consider the possibility that the door is physically jammed in the closed position by distortion of the fuselage or furnishings. This possibility must be considered even if the door normally translates into the open and closed positions.

d. Doors which fall into Category 1 must be in the open position during taxi, takeoff, and landing only when the room is occupied.

e. Doors which fall into Categories 2, 3, or 4 must be in the open position during taxi, takeoff, and landing, regardless of occupancy.

f. The FAA has determined that a higher level of awareness is required to ensure that no door remains closed when it should not be. Because the cabin interior is relatively complex, inspection by flight attendants before takeoff and landing is not sufficient to verify that interior doors are in the proper position. Some type of remote indication is considered necessary. The petitioner's proposal to provide remote indication to the flightcrew is considered adequate.

6. Interior Materials.

When the standards for heat release and smoke emission of interior materials were developed, the FAA incorporated a discriminant, based on passenger capacity. This approach was intended to address smaller airplanes where the ratio of exits to passengers is typically quite good and the evacuation times are expected to be quite low. Under these conditions, the benefits of improved materials were expected to be negligible. The airplane type discussed in the petition was not envisioned by the rulemaking, insofar as the large size with low passenger count is concerned.

The petitioner argues that with the limited number of passengers on the airplane an evacuation of the airplane would occur much faster than on a typical Airbus Model A340-200 series airplane operated by an airline. Therefore, the petitioner proposes that an acceptable level of safety can be obtained for this airplane with materials installed that do not meet the requirements of § 25.853(d), provided that the evacuation time described in § 25.803(c) is reduced to 45 seconds.

Since the main benefit of improved interior materials is to lengthen the time available for evacuation, an arrangement that effectively provides the same evacuation capability would satisfy much of the concern addressed by the requirement, albeit indirectly. This issue was also addressed in NPRM 07-13, and the petitioner's proposal is consistent with the NPRM for post-crash fire safety. The FAA considers that a 45 second improvement in evacuation time over that allowed by the regulation would be required to relax the heat release and smoke emissions standards. That is, the petitioner would have to demonstrate by test or analysis supported by test that the actual passenger arrangement and exit configuration can be evacuated in 45 seconds.

The remaining issue of the inflight fire scenario needs to be addressed as well. The major issue with respect to inflight fires is timely recognition. The interior includes isolated areas

which do not lend themselves to timely detection of a fire. For the purposes of this exemption, an isolated passenger compartment is defined as a room that does not contain an egress path (e.g., a main cabin aisle, crossaisle or passageway) or is isolated by a door and is not occupied for taxi, take off or landing. In order to address the inflight case, the FAA believes that installation of a smoke detector in such areas would compensate for the potential of an increased inflight fire threat. Therefore, each isolated passenger compartment must incorporate a fire detection system that meets the requirements of § 25.858. While this section is written for cargo compartment fire detection systems, the criteria contained therein are considered appropriate to this application.

The FAA's decision

In consideration of the foregoing, I find that a grant of exemption from the requirements of §§ 25.785(b), 25.785(h)(2), 25.785(j), 25.813(e), 25.807(d)(7) and 25.853(c) is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in Title 49 U.S.C. 40113 and 44701, delegated to me by the Administrator (14 CFR 11.53), BaySys is hereby granted an exemption from those requirements, provided that the petitioner complies with the limitations specified below.

I find, further, that a grant of exemption from the requirements of § 25.562(c)(2) through (c)(4) and (c)(6) for the seats in the Main Majlis and the side-facing seats is not in the public interest and does not provide the level of safety required by that section.

The FAA does not disagree with the petitioner that corporate operations were not specifically considered in the promulgation of Amendment 25-64. However, this omission should not be construed as grounds for relief for airplanes engaged in those operations. The cost/benefit analysis that was performed was based on the most prevalent data available, and is pertinent to the vast majority of the affected airplanes and operations. Notwithstanding any variations that may exist in safety records among different airplanes and types of operations, it is clear that the requirements of Amendment 25-64 were intended to be applied to all part 25 airplanes, regardless of airplane size or type of operations (ref. 53 FR 17640/17641, May 17, 1988), and that the goal was to foster an overall enhancement in transport category airplane safety (ref. Notice 86-11, 51 FR 25988, July 17, 1986).

The petitioner's primary arguments in showing why a grant of exemption is in the public interest are that the request does not affect the public at large, and that the cost of compliance is high. Regarding the first point, while it is true that the public at large will not fly on the airplane in question, the FAA's decision on the safety benefits of § 25.562 does affect the public at large. The FAA has determined that this requirement is important for safety, and has not granted exemptions, regardless of the type of operation except where the need for transportation (e.g., emergency medical use) clearly outweighs the potential risk in the event of an accident. A grant of exemption on the basis that the operator declines to receive the safety benefit provided by the rule is effectively an abdication of the FAA's safety oversight role. Thus, a grant of exemption sets a precedent that will affect the public.

Regarding the second point, the type certification basis of the A340, which includes Amendment 25-64, is well known. The petition notes that seats are available that meet the certification basis but do not meet the customer's needs. While the FAA has no basis to dispute the costs of developing a new seat that meets both the regulations and the customer requirements, we believe this is a business decision and not strictly a matter of public interest. In summary, the petitioner has not provided justification for not meeting the seat dynamic testing requirements contained in Amendment 25-64.

Finally, all of the current injury criteria in § 25.562 are feasible and readily met for side-facing seats, and the FAA has consistently applied the requirements of § 25.562(c)(2) through (c)(4) and (c)(6) to side-facing seats. This approach is consistent with other exemptions which we have granted on this subject and is in keeping with available technology. Accordingly, the petitioner's request for exemption from § 25.562(c)(2) through (c)(4) and (c)(6) is denied.

For the remaining regulations for which the petitioner has requested relief, the FAA has concluded that the following requirements and limitations will produce an adequate level of safety for airplanes operating as "private use, not-for hire, not-for-common-carriage."

Limitations

1. Private use.

The airplane must not be operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR parts 125 and 91, subpart F, as applicable.

2. Side-facing seats, § 25.785(b).

a. Existing Criteria: All injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupants of side-facing seats. The Head Injury Criterion (HIC) assessments are required only for head contact with the seat and/or adjacent structures.

b. Body-to-Body Contact: Contact between the head, pelvis, torso or shoulder area of one Anthropomorphic Test Dummy (ATD) with the head, pelvis, torso or shoulder area of the ATD in the adjacent seat is not allowed during the tests conducted in accordance with § 25.562(b)(1) and (b)(2). Contact during rebound is allowed.

c. Thoracic Trauma: If the torso of an ATD at the forward-most seat place impacts the seat and/or adjacent structure during testing, compliance with Thoracic Trauma Index (TTI) injury criterion must be substantiated by dynamic test or by rational analysis based on previous test(s) of a similar seat installation. TTI data must be acquired with a Side Impact Dummy (SID), as defined by 49 CFR part 572, subpart F, or an equivalent ATD or a more appropriate ATD and must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) part 571.214, section S6.13.5. The TTI must be less than 85, as defined in 49 CFR part 572, subpart F. Torso contact during rebound is acceptable and need not be measured.

d. Pelvis: If the pelvis of an ATD at any seat place impacts seat and/or adjacent structure during testing, pelvic lateral acceleration injury criteria must be substantiated by dynamic test or by rational analysis based on previous test(s) of a similar seat installation. Pelvic lateral acceleration must not exceed 130g. Pelvic acceleration data must be processed as defined in FMVSS part 571.214, section S6.13.5.

e. Body-to-Wall/Furnishing Contact: If the seat is installed aft of a structure—such as an interior wall or furnishing that may contact the pelvis, upper arm, chest, or head of an occupant seated next to the structure—the structure or a conservative representation of the structure and its stiffness must be included in the tests. It is recommended, but not required, that the contact surface of the actual structure be covered with at least two inches of energy absorbing protective padding (foam or equivalent) such as Ensolite.

f. Shoulder Strap Loads: Where upper torso straps (shoulder straps) are used for sofa occupants, the tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

g. Occupant Retention: All side-facing seats require end closures or other means to prevent the ATD's pelvis from translating beyond the end of the seat at any time during testing.

h. Test Parameters:

- (1) All seat positions need to be occupied by ATDs for the longitudinal tests.
- (2) A minimum of one longitudinal test, conducted in accordance with the conditions specified in § 25.562(b)(2), is required to assess the injury criteria as follows. Note that if a seat is installed aft of structure (such as an interior wall or furnishing) that does not have a homogeneous surface, an additional test or tests may be required to demonstrate that the injury criteria are met for the area which an occupant could contact. For example, different yaw angles could result in different injury considerations and may require separate tests to evaluate.

- For configurations without structure (such as a wall or bulkhead) installed directly forward of the forward seat place, Hybrid II ATDs or equivalent must be in all seat places.
- For configurations with structure (such as a wall or bulkhead) installed directly forward of the forward seat place, a Side Impact Dummy or equivalent ATD or more appropriate ATD must be in the forward seat place and a Hybrid II ATD or equivalent must be in all other seat places.
- The test may be conducted with or without a deformed floor.
- The test must be conducted with either no yaw or 10 degrees yaw for evaluating occupant injury. Deviating from the no yaw condition must

not result in the critical area of contact not being evaluated. Allowing the test to be conducted at 10 degrees yaw will permit many occupant injury tests to be considered in conjunction with the structural test. Note that this condition does not provide relief from the requirement that torso restraint straps, where installed, must remain on the occupant's shoulder during the impact condition of § 25.562(b)(2).

(3) For the vertical test, conducted in accordance with the conditions specified in § 25.562(b)(1), Hybrid II ATDs or equivalent must be used in all seat positions.

3. Distance Between Exits.

For an airplane that is required to comply with § 25.807(f)(4), Amendment 25-67, which has more than one passenger emergency exit on each side of the fuselage, no passenger emergency exit may be more than 60 feet from any adjacent passenger emergency exit on the same side of the same deck of the fuselage, as measured parallel to the airplane's longitudinal axis between the nearest exit edges, unless the following conditions are met:

a. Seats must be positioned as follows:

(1) When greater than 60 feet between exits exists on each side of the fuselage, each passenger seat must be located within 30 feet from the nearest exit on each side of the fuselage, measured parallel to the airplane's longitudinal axis, between the nearest exit edge and the front of the seat bottom cushion.

(2) When greater than 60 feet between exits exists on only one side of the fuselage, each passenger seat must be located within 60 feet from the nearest exit on that side of the fuselage, and within 30 feet on the opposite side.

b. The number of passenger seats located between two adjacent pairs of emergency exits (commonly referred to as a passenger zone) or between a pair of exits and a bulkhead or a compartment door (commonly referred to as a "dead-end zone"), may not exceed the following:

(1) For zones between two pairs of exits, 50 percent of the combined rated capacity of the two pairs of emergency exits.

(2) For zones between one pair of exits and a bulkhead, 40 percent of the rated capacity of the pair of emergency exits.

c. The total number of passenger seats in the airplane may not exceed 33 percent of the maximum seating capacity for the airplane model, using the exit ratings listed in § 25.807(g) for the original certified exits or the maximum allowable after modification when exits are deactivated, whichever is less.

d. A distance of more than 60 feet between adjacent passenger emergency exits on the same side of the same deck of the fuselage, as measured parallel to the airplane's longitudinal axis between the nearest exit edges, is allowed only once on each side of the fuselage.

4. Interior doors, § 25.813(e).

a. A majority of flight attendant seats must be oriented to face the passenger cabin.

b. Each door between passenger compartments must be frangible.

- c. Doors that fall into Category 1 must be in the open position during taxi, takeoff, and landing only when the room is occupied or when passengers must pass through the room to reach an emergency exit.
- d. Doors that fall into Categories 2, 3, or 4 must be in the open position during taxi, takeoff, and landing, regardless of occupancy.
- e. Each door between passenger compartments must have a means to signal to the flightcrew when the door is closed. Appropriate procedures/limitations must be established to ensure that takeoff and landing is prohibited when such compartments are occupied and the door is closed.
- f. Doors between passenger compartments must have dual means to retain them in the open position and each means must be capable of withstanding the inertia loads specified in § 25.561.
- g. Doors in Categories 2, 3, or 4, which are installed across a longitudinal aisle, must translate laterally to open and close.

5. Interior Materials, § 25.853(c).

- a. When materials are installed that do not comply with the requirements of part 25, appendix F, parts IV and V, it must be shown that the passengers and crewmembers can be evacuated in 45 seconds or less, under the conditions described in part 25, appendix J.
- b. There must be means that meet the requirements of § 25.858(a) through (d) to signal the flightcrew in the event of a fire in any isolated room not occupiable for taxi, takeoff, and landing, which can be closed off from the rest of the cabin by a door. The indication must identify the compartment where the fire is located.

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Signed by Michael J. Kaszycki

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