rest compartment in the event of a fire in the cargo compartment.

19. Means must be provided to prevent access into the Class C cargo compartment during all airplane operations and to ensure that the maintenance door is closed during all airplane flight operations.

20. All enclosed stowage compartments within the crew rest that are not limited to stowage of emergency equipment or airplane-supplied equipment (*e.g.,* bedding) must meet the design criteria given in the table below. As indicated by the table below, this special condition does not address enclosed stowage compartments greater than 200 ft^3 in interior volume. The in-flight accessibility of very large, enclosed stowage compartments and the subsequent impact on the crewmembers' ability to effectively reach any part of the compartment with the contents of a hand fire extinguisher will require additional fire protection considerations similar to those required for inaccessible compartments such as Class C cargo compartments.

Fire protection features	Stowage compartment interior volumes		
	Less than 25 ft^3	25 ft^3 to 57 ft^3	57 ft^3 to 200 ft^3
Materials of Construction [1]	Yes	Yes	Yes.
Detectors [2]	No	Yes	Yes.
Liner [3]	No	No	Yes.
Locating Device [4]	No	Yes	Yes.

[1] *Material:* The material used to construct each enclosed stowage compartment must at least be fire resistant and must meet the flammability standards established for interior components per the requirements of § 25.853. For compartments less than 25 ft^3 in interior volume, the design must ensure the ability to contain a fire likely to occur within the compartment under normal use.

[2] *Detectors:* Enclosed stowage compartments equal to or exceeding 25 ft^3 in interior volume must be provided with a smoke or fire detection system to ensure that a fire can be detected within a one-minute detection time. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

(a) A visual indication in the flight deck within one minute after the start of a fire;

(b) An aural warning in the crew rest compartment; and

(c) A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the positioning of flight attendants throughout the main passenger compartment during various phases of flight.

[3] *Liner:* If it can be shown that the material used to construct the stowage compartment meets the flammability requirements of a liner for a Class B cargo compartment, then no liner would be required for enclosed stowage compartments equal to or greater than 25 ft^3 in interior volume but less than 57 ft^3 in interior volume. For all enclosed stowage compartments equal to or greater than 57 ft^3 in interior volume *but less than or equal to 200 ft^3,* a liner must be provided that meets the requirements of § 25.855 at Amendment 25–60 for a class B cargo compartment.

[4] *Location Detector:* Crew rest areas which contain enclosed stowage compartments exceeding 25 ft^3 interior volume and which are located away from one central location such as the entry to the crew rest area or a common area within the crew rest area would require additional fire protection features and/or devices to assist the firefighter in determining the location of a fire.

Issued in Kansas City, Missouri, on December 9, 2024.

Patrick R. Mullen,

Manager, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service.

[FR Doc. 2024–29432 Filed 12–12–24; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA–2024–2387; Special Conditions No. 25–871–SC]

Special Conditions: Airbus Models A321 neo ACF and A321 neo XLR; Single-Occupant Oblique Seats With Pretensioner Restraint Systems

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Airbus Model A321 neo ACF and A321 neo XLR airplanes. These airplanes have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. This design feature incorporates oblique (side-facing) passenger seats which may include a 3-point restraint system with pretensioner. These oblique seats may be installed at an angle of 18 to 45 degrees to the aircraft centerline and have surrounding furniture that introduces occupant and loading concerns. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: This action is effective on Airbus S.A.S. on December 13, 2024. Send comments on or before January 27, 2025.

ADDRESSES: Send comments identified by Docket No. FAA–2024–2387 using any of the following methods:

- *Federal eRegulations Portal:* Go to *www.regulations.gov* and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M–30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue SE, Room W12–140, West Building Ground Floor, Washington, DC 20590–0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at 202–493–2251.

Docket: Background documents or comments received may be read at *www.regulations.gov* at any time. Follow the online instructions for accessing the docket or go to Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Shannon Lennon, Cabin Safety Section, AIR–624, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service, Federal Aviation Administration, 2200 South 216th Street, Des Moines, Washington 98198; telephone (206) 231–3209; fax (206) 231–3827; email *Shannon.Lennon@faa.gov.*

SUPPLEMENTARY INFORMATION: The substance of these special conditions has been published in the **Federal**

Register for public comment in several prior instances with no substantive comments received. Therefore, the FAA finds, pursuant to 14 CFR 11.38(b), that new comments are unlikely, and notice and comment prior to this publication are unnecessary.

Privacy

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in title 14, Code of Federal Regulations (14 CFR) 11.35, the FAA will post all comments received without change to *www.regulations.gov,* including any personal information you provide. The FAA will also post a report summarizing each substantive verbal contact received about these special conditions.

Confidential Business Information

Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to these special conditions contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to these special conditions, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as ''PROPIN.'' The FAA will treat such marked submissions as confidential under the FOIA, and the indicated comments will not be placed in the public docket of these special conditions. Send submissions containing CBI to the individual listed in the **FOR FURTHER INFORMATION CONTACT** section above. Comments the FAA receives, which are not specifically designated as CBI, will be placed in the public docket for these special conditions.

Comments Invited

The FAA invites interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

The FAA will consider all comments received by the closing date for comments. The FAA may change these special conditions based on the comments received.

Background

On September 23, 2024, Airbus S.A.S. applied for an amendment to Type Certificate No. (TC no.) A28NM to include new Models A321 neo ACF and A321 neo XLR airplanes. Airbus Model A321 neo ACF and Model A321 neo XLR airplanes, which are derivatives of the Model A321 currently approved under TC no. A28NM, are twin-engine transport category airplanes with a maximum passenger capacity of 244. The maximum takeoff weight of the Airbus Model A321 neo ACF is approximately 213,848 pounds, while the Airbus Model A321 neo XLR has a maximum takeoff weight of approximately 222,667 pounds.

Type Certification Basis

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.101, Airbus S.A.S must show that Models A321 neo ACF and A321 neo XLR airplanes, as changed, continue to meet the applicable provisions of the regulations listed in TC No. A28NM, or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

If the Administrator finds that the applicable airworthiness regulations (*e.g.,* 14 CFR part 25) do not contain adequate or appropriate safety standards for the Airbus Models A321 neo ACF and A321 neo XLR airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, Airbus Models A321 neo ACF and A321 neo XLR airplanes must comply with the exhaust-emission requirements of 14 CFR part 34 and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Features

Airbus Models A321 neo ACF and A321 neo XLR airplanes will incorporate a novel or unusual design feature: single occupant oblique (side-facing) passenger seats that may include a 3-point restraint system with pretensioner. These oblique seats may be installed at an angle of 18 to 45 degrees relative to the aircraft centerline and have surrounding furniture that introduces occupant and loading concerns.

Discussion

Title 14, Code of Federal Regulations (14 CFR) 25.785(d) requires that each occupant of a seat that makes more than an 18 degree angle with the vertical plane containing the airplane centerline must be protected from head injury by a safety belt and an energy absorbing rest that will support the arms, shoulders, head, and spine, or by a safety belt and shoulder harness that will prevent the head from contacting any injurious object.

The proposed Airbus Model A321 neo ACF and A321 neo XLR seat installations are novel in that the current requirements do not adequately address protection of the occupant's neck and spine for seating configurations that are positioned at angles greater than 18 degrees up to and including 45 degrees from the airplane centerline. The installation of passenger seats at angles of 18 to 45 degrees to the airplane centerline is unique due to the seat/occupant interface with the surrounding furniture that introduces occupant alignment/loading concerns with or without the installation of a 3-point or airbag restraint systems. The existing special conditions for Airbus Model A321 neo ACF series airplane oblique seat installations (Special Conditions No. 25–779–SC) also do not address oblique seats with 3-point restraint systems equipped with pretensioners. Therefore, in order to provide a level of safety equivalent to that afforded to occupants of forward and aft facing seating, additional airworthiness standards in the form of new special conditions are necessary.

The FAA has been conducting and sponsoring research on appropriate injury criteria for oblique (side-facing) seat installations. To reflect current research findings, the FAA issued Policy Statement PS–AIR–25–27, ''Technical Criteria for Approving Side-Facing Seats,'' dated July 11, 2018, which defines injury criteria for oblique seats.

FAA-sponsored research has found that an un-restrained flailing of the

upper torso, even when the pelvis and torso are nearly aligned, can produce serious spinal and torso injuries. At lower impact severities, even with significant misalignment between the torso and pelvis, these injuries did not occur. Tests with an FAA H–III anthropomorphic test dummy (ATD) have identified a level of lumbar spinal tension corresponding to the no-injury impact severity. This level of tension is included as a limit in the special conditions. The spine tension limit selected is conservative with respect to other aviation injury criteria since it corresponds to a no-injury loading condition.

Other restraint systems, in lieu of single lap belt restraint systems have been used to comply with the occupant injury criteria of § 25.562(c)(5). For instance, shoulder harnesses have been widely used on flight-attendant seats, flight-deck seats, in business jets, and in general-aviation airplanes to reduce occupant head injury in the event of an emergency landing. Special conditions, pertinent regulations, and published guidance exist that relate to other restraint systems. However, the use of pretensioners in the restraint system on transport category airplane seats to comply with the occupant injury criteria of § 25.562(c)(5) is a novel design.

Pretensioner technology involves a step-change in loading experienced by the occupant for impacts below and above that at which the device deploys, because activation of the shoulder harness, at the point at which the pretensioner engages, interrupts upper-torso excursion. Such excursion could result in the head-injury criteria (HIC) being higher at an intermediate impact condition than that resulting from the maximum impact condition corresponding to the test conditions specified in § 25.562. See condition 7 in these special conditions.

The ideal triangular maximum-severity pulse is defined in Advisory Circular (AC) 25.562–1B, ''Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes''. For the evaluation and testing of less-severe pulses for purposes of assessing the effectiveness of the pretensioner setting, a similar triangular pulse should be used with acceleration, rise time, and velocity change scaled accordingly. The magnitude of the required pulse should not deviate below the ideal pulse by more than 0.5g until 1.33 t1 is reached, where t1 represents the time interval between 0 and t1 on the referenced pulse shape, as shown in AC 25.562–1B. This is an acceptable method of compliance to the test requirements of the special conditions.

Additionally, the pretensioner might not provide protection, after actuation, during secondary impacts. Therefore, the case where a small impact is followed by a large impact should be addressed. If the minimum deceleration severity at which the pretensioner is set to deploy is unnecessarily low, the protection offered by the pretensioner may be lost by the time a second, larger impact occurs.

Conditions 1 through 7 address occupant protection in consideration of the oblique-facing seats. Conditions 8 through 10 ensure that the pretensioner system activates when intended and protects a range of occupants under various accident conditions. Conditions 11 through 16 address maintenance and reliability of the pretensioner system, including any outside influences on the mechanism, to ensure it functions as intended.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Applicability

As discussed above, these special conditions are applicable to the Airbus Model A321 neo ACF and Model A321 neo XLR airplanes. Should Airbus S.A.S. apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only a certain novel or unusual design feature on one model series of airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Authority Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, and 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for the Airbus Model A321 neo ACF and A321 neo XLR series airplanes.

In addition to the requirements of § 25.562, passenger seats installed at an angle between 18 degrees and 45 degrees from the aircraft centerline must meet the following conditions:

1. *Body-to-Wall and Body-to-Furnishing Contact:*

If a seat is installed aft of a structure (*e.g.,* interior wall or furnishings) that does not provide a homogenous contact surface for the expected range of occupants and yaw angles, then additional analysis and tests may be required to demonstrate that the injury criteria are met for the area that an occupant could contact. For example, if, in addition to a pretensioner restraint system, an airbag device is present, different yaw angles could result in different airbag-device performance, then additional analysis or separate tests may be necessary to evaluate performance.

2. *Neck Injury Criteria:*

The seating system must protect the occupant from experiencing serious neck injury. In addition to a pretensioner restraint system, if an airbag device also is present, the assessment of neck injury must be conducted with the airbag device activated, unless there is reason to also consider that the neck injury potential would be higher for impacts below the airbag-device deployment threshold.

(a) The Nij (calculated in accordance with 49 CFR 571.208) must be below 1.0, where Nij = Fz/Fzc + My/Myc, and Nij critical values are:

(1) Fzc = 1530 lbs. for tension
(2) Fzc = 1385 lbs. for compression
(3) Myc = 229 lb-ft in flexion
(4) Myc = 100 lb-ft in extension

(b) In addition, peak Fz must be below 937 lbs. in tension and 899 lbs. in compression.

(c) Rotation of the head about its vertical axis relative to the torso is limited to 105 degrees in either direction from forward facing.

(d) The neck must not impact any surface that would produce concentrated loading on the neck.

3. *Spine and Torso Injury Criteria:*

(a) The lumbar spine tension (Fz) cannot exceed 1,200 lbs.

(b) Significant concentrated loading on the occupant's spine, in the area between the pelvis and shoulders during impact, including rebound, is not acceptable. During this type of contact, the interval for any rearward (X direction) acceleration exceeding 20g must be less than 3 milliseconds as measured by the thoracic instrumentation specified in 49 CFR part 572, subpart E, filtered in accordance with SAE International

(SAE) recommended practice J211/1, ''Instrumentation for Impact Test-Part 1-Electronic Instrumentation.''

(c) The occupant must not interact with the armrest or other seat components in any manner significantly different than would be expected for a forward-facing seat installation.

4. *Pelvis Criteria:*

Any part of the load-bearing portion of the bottom of the ATD pelvis must not translate beyond the edges of the seat bottom seat-cushion supporting structure.

5. *Femur Criteria:*

Axial rotation of the upper leg (about the Z-axis of the femur per SAE Recommended Practice J211/1) must be limited to 35 degrees from the nominal seated position. Evaluation during rebound does not need to be considered.

6. *ATD and Test Conditions:*

Longitudinal tests conducted to measure the injury criteria above must be performed with the FAA Hybrid III ATD, as described in SAE 1999–01–1609, ''A Lumber Spine Modification to the Hybrid III ATD for Aircraft Seat Tests.'' The tests must be conducted with an undeformed floor, at the most-critical yaw cases for injury, and with all lateral structural supports (*e.g.* armrests or walls) installed.

Note: The applicant must demonstrate that the installation of seats via plinths or pallets meets all applicable requirements. Compliance with the guidance contained in policy memorandum PS–ANM–100–2000–00123, ''Guidance for Demonstrating Compliance with Seat Dynamic Testing for Plinths and Pallets,'' dated February 2, 2000, may be applied.

7. *Head Injury Criteria:*

The HIC value must not exceed 1000 at any condition at which the pretensioner does or does not deploy, up to the maximum severity pulse that corresponds to the test conditions specified in § 25.562. Tests must be performed to demonstrate this, taking into account any necessary tolerances for deployment.

When an airbag is present in addition to the pretensioner restraint system, and the anthropomorphic test dummy (ATD) has no apparent contact with the seat/structure but has contact with the airbag, a HIC unlimited score in excess of 1000 is acceptable provided the HIC15 score (calculated in accordance with 49 CFR 571.208) for the contact is less than 700. ATD head contact with the seat or other structure, through the airbag, or contact subsequent to contact with the airbag, requires a HIC value that does not exceed 1000.

8. *Protection During Secondary Impacts:*

The pretensioner activation setting must be demonstrated to maximize the probability of the protection being available when needed, considering secondary impacts.

9. *Protection of Occupants Other than 50th Percentile:*

Protection of occupants for a range of stature from a 2-year-old child to a 95th percentile male must be shown. For shoulder harnesses that include pretensioners, protection of occupants other than a 50th percentile male may be shown by test or analysis. In addition, the pretensioner must not introduce a hazard to passengers due to the following seat configurations:

(a) The seat occupant is holding an infant.

(b) The seat occupant is a child in a child-restraint device.

(c) The seat occupant is a pregnant woman.

10. *Occupants Adopting the Brace Position:*

Occupants in the traditional brace position when the pretensioner activates must not experience adverse effects from the pretensioner activation.

11. *Inadvertent Pretensioner Actuation:*

(a) The probability of inadvertent pretensioner actuation must be shown to be extremely remote (*i.e.,* average probability per flight hour of less than 10^{-7}).

(b) The system must be shown not susceptible to inadvertent pretensioner actuation as a result of wear and tear, or inertia loads resulting from in-flight or ground maneuvers likely to be experienced in service.

(c) The seated occupant must not be seriously injured as a result of inadvertent pretensioner actuation.

(d) Inadvertent pretensioner activation must not cause a hazard to the airplane, nor cause serious injury to anyone who may be positioned close to the retractor or belt (*e.g.,* seated in an adjacent seat or standing adjacent to the seat).

12. *Availability of the Pretensioner Function Prior to Flight:*

The design must provide means for a crewmember to verify the availability of the pretensioner function prior to each flight, or the probability of failure of the pretensioner function must be demonstrated to be extremely remote (*i.e.,* average probability per flight hour of less than 10^{-7}) between inspection intervals.

13. *Incorrect Seat Belt Orientation:*

The system design must ensure that any incorrect orientation (twisting) of the seat belt does not compromise the pretensioner protection function.

14. *Contamination Protection:*

The pretensioner mechanisms and controls must be protected from external contamination associated with that which could occur on or around passenger seating.

15. *Prevention of Hazards:*

The pretensioner system must not induce a hazard to passengers in case of fire, nor create a fire hazard, if activated.

16. *Functionality After Loss of Power:*

The system must function properly after loss of normal airplane electrical power, and after a transverse separation in the fuselage at the most critical location. A separation at the location of the system does not have to be considered.

Issued in Kansas City, Missouri, on December 9, 2024.

Patrick R. Mullen,

Manager, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service.

[FR Doc. 2024–29442 Filed 12–12–24; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 27

[Docket No. FAA–2024–0875; Special Conditions No. 27–058–SC]

Special Conditions: Skyryse, Robinson Helicopter Company Model R66 Helicopter; Interaction of Systems and Structures

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Robinson Helicopter Company (Robinson) Model R66 helicopter. This helicopter, as modified by Skyryse, will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for normal category helicopters. This design feature is a novel control input and fly-by-wire (FBW) system. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Effective December 13, 2024.

FOR FURTHER INFORMATION CONTACT: Daniel Moore, Airframe Section, AIR–622, Technical Policy Branch, Policy and Standards Division, Aircraft