



Federal Aviation Administration

Memorandum

Date: June 10, 2016

To: Manager, Transport Standards Staff, International Branch, ANM-116

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Sanjay Ralhan, Program Manager, International Branch, ANM-116

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Increase of the Maximum Passenger Capacity on Airbus Model A320-211, -212, -214, -231, -232 and -233 Airplanes Installed with Wing Tip Fence (WTF) and Modification 158708 (MAX PAX), FAA Project Number AT10621IB-T

ELOS Memo # AT10621IB-T-CS-2

Regulatory Ref.: 14 CFR 25.807(g)

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for Airbus Model A320-211, -212, -214, -231, -232 and -233 airplanes installed with Wing Tip Fence (WTF) and Modification 158708 (MAX PAX).

Background

Historically, the regulations established maximum passenger capacity by the combination of the type and number of installed exits. There were many inconsistencies in the way the combinations were assigned a passenger limit. Prior to Amendment 25-32, Title 14, Code of Federal Regulations (14 CFR) 25.807 contained an allowance to increase the number of passengers by a maximum of 10 if the airplane included installation of automatically deployed and inflated escape slides. The automatically deployed and inflated slide provision was added as an incentive to improve safety. At Amendment 25-32 of § 25.807, automatically deployed and inflated slides became a requirement and the FAA withdrew the extra passengers provision. Subsequent amendments provide a passenger credit for each installed exit pair. The total passenger capacity is determined by adding the credit for the different exit types.

Airbus performed testing to demonstrate that a certain Airbus Model A320 exit arrangement is superior to that required by the regulations and therefore justified an increased passenger capacity. The series of comparative tests demonstrated the evacuation related performance improvements (wider passageway at the inboard portion of the passageway, a wider slide, increased beam strength of the slide and an oversized exit meeting the minimum width and height requirements of a Type B exit), of the Airbus single aisle oversized Type I exits, are significantly better than a standard Type C exit installation.

In an effort to obtain an increased maximum passenger capacity on Airbus Model A320-211, -212, -214, -231, -232 and -233 airplanes installed with WTF, which has identical exits at doors 1 and 4, Airbus is utilizing the data from the tests performed on certain Airbus Model A320 airplanes to demonstrate that Airbus Model A320-211, -212, -214, -231, -232 and -233 airplanes installed with the WTF exit arrangement is superior to that required by the regulations and therefore justified for an increased passenger capacity.

Applicable regulation(s)

14 CFR 25.807(g)

Regulation(s) requiring an ELOS finding

14 CFR 25.807(g)

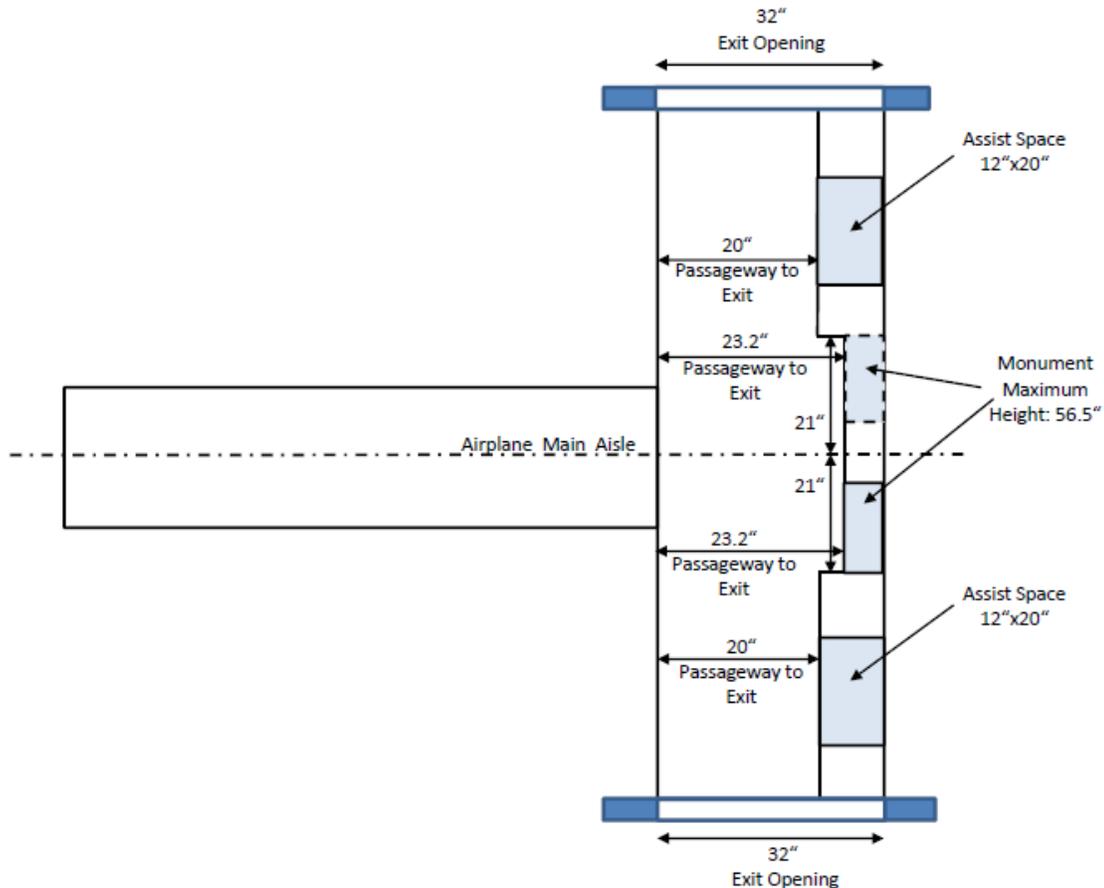
Description of compensating design features or alternative Methods of Compliance (MoC) which allow the granting of the ELOS (including design changes, limitations or equipment needed for equivalency)

The floor level exits of the baseline Model A320-211, -212, -214, -231, -232 and -233 airplanes installed with WTF provide an opening of 32 inches x 73 inches which exceeds the dimensions required for Type B exits. The slide/raft or wide slide assist means, that are required to be installed for the proposed increase in passenger seating capacity, provide a sliding surface which is more than twice as wide (82.75 inches (+3.0 inches, -2.0 inches) versus 30.5 inches) as the standard slide. These assist means are equipped with an enhanced light emitting diode (LED) lighting system that provides a greater visibility of the evacuee ground contact area. In addition, the slide/raft and wide slide units (the latter are derived from the slide/raft for airplanes that will not be used for extended over-water operations) provide beam strength levels meeting the requirements of Technical Standard Order (TSO) C69c.

The FAA will add the following Limitations to Type Certificate Data Sheet (TCDS) A28NM for Model A320-211, -212, -214, -231, -232 and -233 airplanes installed with WTF and Modification 158708 (MAX PAX):

- The exit passageway width, starting at the aircraft aisle centerline and extending 21 inches outboard from the aircraft aisle centerline, must be a minimum of 23.2 inches. Any attendant seat or other assembly installed on the side of the exit passageway must not result in a passageway less than 23.2 inches for the inboard portion of the

passageway. The remaining passageway (starting 21 inches from the aircraft centerline to the emergency exit) must be a minimum of 20 inches. The height of the attendant seat or other assembly is limited to a maximum height of 56.5 inches.



- The unobstructed exit dimensions of the floor level emergency exits must not be less than 32 inches x 73 inches.
- A wide slide (sliding surface width 82.75 inches (+3.0 inches, -2.0 inches)) must be installed at doors 1 and 4.
- The wide slides installed at doors #1 and #4 must have a beam strength meeting the requirements of TSO C69c.

Explanation of how design features or alternative Methods of Compliance (MoC) provide an equivalent level of safety to the level of safety intended by the regulation

The compensating design features listed above were subjected to extensive testing on certain Model A320 series airplanes. Comparative back-to-back tests, using a high-fidelity mock-up,

demonstrated that Model A320 floor level exits fitted with slide/rafts or wide slides provide much better egress performance compared to a representative Type C exit fitted with standard slides as required by the regulation. This result was further substantiated by two partial evacuation tests on an Airbus Model A320 aircraft. Prior to the tests, the FAA and European Aviation Safety Agency (EASA) agreed to pass/fail criteria for a door rating (number of seats permitted per pair of exits) of 65 and the test results met, or exceeded, the established criteria.

Airbus is utilizing the data from the previous tests to substantiate the proposed passenger increase on Airbus Model A320-211, -212, -214, -231, -232 and -233 airplanes installed with the WTF and Modification 158708 (MAX PAX), i.e., fitted with slide/raft or wide slide emergency egress assist means as described above, provide an ELOS to § 25.807(g) with a maximum passenger capacity of 190.

FAA approval and documentation of the ELOS finding

This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The TAD has assigned a unique ELOS memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS memorandum number must be listed in the type certificate data sheet under the Certification Basis section. An example of an appropriate statement is provided below.

Equivalent Level of Safety Findings have been made for the following regulation(s):

14 CFR 25.807(g) Emergency exits (documented in TAD ELOS Memo AT10621IB-T-CS-2)

Original signed by Jeff Gardlin (For)
 Transport Airplane Directorate,
 Aircraft Certification Service

6/10/16
 Date

ELOS Originated by Airframe and Cabin Safety Branch	Project Engineer, Dan Jacquet	ANM-115
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