U.S. Department of Transportation

Federal Aviation Administration

Memorandum

Subject:	INFORMATION: Equivalent Level of Safety Finding for the Airbus A380-800, Project No Project No. CP101	Date:	28 September 05
		Reg Ref:	§§ 25.841, 25.843, 25.1309, 25.365(d)
From:	Manager, Transport Standards Staff, Propulsion/Mechanical Systems Branch, ANM-112	Reply to Attn of:	Steve Happenny ANM-112
To:	Manager, Transport Standards Staff, International Branch, ANM-116	ELOS Memo #:	CP101-S-15

Background

The cabin pressurization regulatory standards for the A380-800, which is a new airplane model, are located in § 25.841, as amended by Amendment 25-87. Section 25.841 provides standards for pressurized compartments, pressure controls, and pressure relief valves for transport category airplanes. Testing requirements for demonstrating compliance with many of the requirements of § 25.841 are addressed in § 25.843. Advisory Circular 25-22 provides some guidance about the intent of, and need for, § 25.841(b)(3) design requirements associated with outflow and safety valves.

Airbus has stated their intent to incorporate an integrated cabin pressure outflow and safety valve system in the Airbus Model A380. Because this proposed design would not meet the literal requirements of §§ 25.841, 25.843 and 25.1309, Airbus has requested that the FAA make a finding of equivalent safety.

It should be noted that Airbus A380-800 design does include traditional pneumatic overpressure relief valves and, per information provided by EASA, these are part of the type design. However, Airbus does not want to take credit of those valves regarding literal compliance to § 25.843.

Applicable regulation(s)

§§ 25.841, 25.843, 25.1309, 25.365(d)

Regulation(s) requiring an ELOS

§ 25.843(b)(1)

Description of compensating design features or alternative standards that allow the granting of the ELOS (including design changes, limitations or equipment need for equivalency)

Section 25.843(b)(1) requires that "Tests of the functioning and capacity of the positive and negative pressure differential valves, and of the emergency release valve, to simulate the effects of closed regulator valves." Since the A380-800 does not incorporate regulator valves that are distinct from emergency release valves, it is impossible to perform the test with closed regulator valves. It is therefore impossible to comply literally with § 25.843(b)(1). Therefore, Airbus must design an appropriate test(s) to cover the intent of § 25.843(b)(1).

Also, § 25.365(d) specifies that structural pressure loads be considered in relation to the maximum pressure release valve setting. Due to the proposed design features of the A380, the phrase "maximum pressure release valve setting" should be understood to represent that maximum pressure allowed by the overpressure relief function imbedded in the software logic governing the regulating outflow valves.

Explanation of how design features or alternative standards provide an equivalent level of safety to the level of safety intended by the regulation

Airbus design meets the intent of the regulation by providing a means to ensure that cabin differential pressure will not exceed set limits. A380-800 design accomplishes by incorporating the functionality of the positive pressure differential relief valve into the pressure regulator valve. The means that this is accomplished is through the software that controls the pressure regulator valve (i.e., outflow valve). Airbus will demonstrate that this dual-use system satisfies the intent of 25.841(b)(1); it is only that the means of compliance will be new because of the unique design features of their system.

Section 25.365(d) specifies that structural pressure loads to be considered, in relation to the maximum pressure release valve setting. Airbus will demonstrate that their dual-use system satisfies the intent of 25.365(d); it is only that the means of compliance will be new because of the unique design features of their system.

In addition, due to increased level of Cabin Pressure Control System (CPCS) integration and the associated increased complexity, there is a potential for common cause failures and for development errors. The Common Mode Analysis must show that the risk of common cause failures and of development errors has been adequately mitigated, and that the proposed design is equivalently safe or safer, with respect of such risks, to a conventional design.

FAA approval and documentation of the ELOS

The FAA has approved the aforementioned Equivalent Level of Safety Finding in issue paper S-15. In addition, because the issue paper now follows the corresponding JAA CRI F-38, the FAA has accepted this CRI as the basis for a finding of equivalent safety.

This memorandum provides standardized documentation of the ELOS that is non-proprietary and can be made available to the public. The Transport Directorate has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number should be listed in the Type Certificate Data Sheet under the Certification Basis section (TC's & ATC's) or in the Limitations and Conditions Section of the STC Certificate. An example of an appropriate statement is provided below.

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

§ 25.843(b)(1)“Tests for pressurized cabins” (Documented in TAD ELOS Memo CP101-S-15)]

Original Signed by Neil D. Schalekamp	*September 28, 2005*
Manager, TSS, Propulsion/Mechanical Systems Branch, ANM-112	Date

ELOS Originated by: Standards Staff, Mechanical Systems Branch	Project Engineer Stephen M Happenny	Routing Symbol ANM-112