



Federal Aviation Administration

Memorandum

Date: November 23, 2007

To: See Distribution

From: Manager, Transport Airplane Directorate, Aircraft Certification Service,
ANM-100

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Subject: Policy Statement on an Unreliable Design of Seat Belt Attachment
Fittings on Passengers' Seats and Compliance with § 25.601

Memo No. ANM-04-115-28

Regulatory Reference: § 25.601, 25.785(b)

Summary

This policy memorandum provides Federal Aviation Administration (FAA) certification policy with respect to seat belt attachment fittings of an unreliable design that are installed on passenger seats. Following an investigation, the FAA determined that these fittings, commonly referred to as “D-ring” attachment fittings, do not comply with § 25.601. This determination means that the FAA will not approve installations of seat belt attachment fittings of this design. The determination was used to respond to National Transportation Safety Board (NTSB) recommendation A-99-011. The FAA has issued Special Airworthiness Information Bulletin (SAIB) No. NM-04-37 recommending that the D-ring seat belt attachment fittings be replaced with fittings of an improved design.

Definition of Key Terms

In the policy statement below, the formatting (*italics*, plain text, or [square brackets]) and terms used (“must,” “should,” or “recommend”) have a specific meaning that is explained in Attachment 1.

Current Regulatory and Advisory Material

The applicable regulations relative to the design of seat belt attachments are: §§ 25.785(b) and 25.601, which lay out the regulatory basis for the installation and approval of D-ring and other types of seat belt attachment fittings. Special Airworthiness Information Bulletin (SAIB) No. NM-04-37 (issued December 22, 2003), recommends the installation of seat belt attachments that are of an improved design in lieu of the D-ring attachment fittings.

Relevant Past Practice

The FAA has received reports indicating that, during two accidents involving transport category airplanes, several passengers' seat belts had released from their seat attachments. The seat belts remained buckled but became unhooked at their attachment fittings to the seat structure and were no longer restraining the passengers. The absence of damage to the hook end (see Figure 1) of the seat belts and their attachment fittings strongly indicates that, in each case, the fitting aligned with the opening in the hook end of the seat belt, allowing the hook end to detach from its fitting on the seat. Detachment of a seat belt hook end from the attachment fitting would result in the occupant not being restrained during an accident, turbulence, or a hard landing and could result in injury to the seated occupant under those conditions.

During the investigation of the seat belt hook end detachment issue, the FAA discovered a repeatable method of demonstrating seat belt detachment from the D-ring type seat belt attachment fitting (Figure 1). The detachment event occurs when the seat belt hook end is near the fastener attaching the D-ring attachment fitting to the seat. The hook end of the seat belt can become aligned so that it is contacting two points on the D-ring attachment fitting. In this configuration, the spring keeper on the belt hook end is aligned with the upper portion of the D-ring fitting (Figure 2). Detachment occurs when the seat belt applies an out-of-plane load to its hook end. As the seat belt attempts to align the hook end with the load, the spring keeper is depressed and the seat belt becomes detached from the fitting.

Many seat belts have a hole in the spring keeper that allows installation of a safety/cotter pin. The safety/cotter pin prevents the spring keeper from opening under low loading conditions. But higher loads will shear the pin. Loads applied by an occupant being restrained by the seat belt during turbulence, hard landing, or an accident are enough to shear the safety/cotter pin. So installing a safety/cotter pin does not prevent the seat belt from detaching from the fitting during turbulence, hard landing, or an accident.

Seats involved in the accidents were equipped with D-ring type seat belt attachment fittings. Newer design fittings cannot be manipulated to release in the manner described above. Available information indicates that seat manufacturers stopped using D-ring fittings on new seat designs about ten years ago. But seat manufacturers currently manufacturing new seats according to designs approved more than ten years ago may still be using D-ring type seat belt attachment fittings.

Figure 1

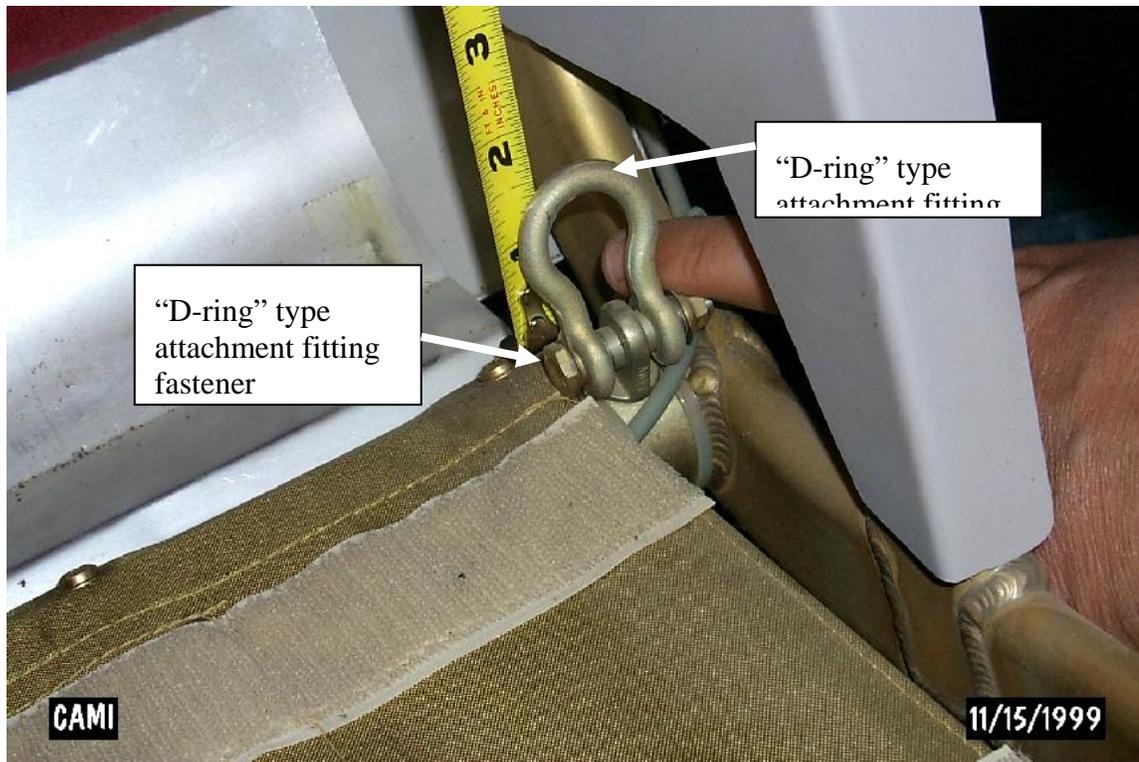
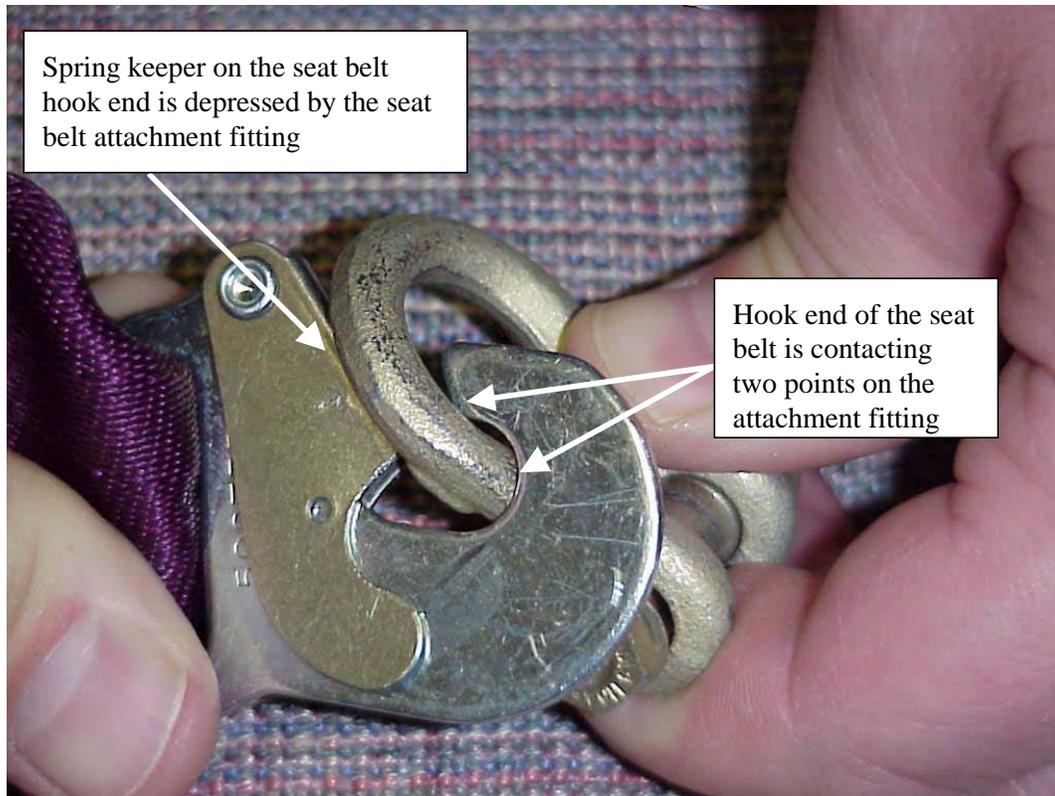


Figure 2



Policy

The FAA has determined that D-ring seat belt attachment fittings are an unreliable seat belt attachment fitting on passenger seats and that this design does not comply with § 25.601. This design of seat belt attachment fitting should not be approved on any new installations of passenger seats (including the reconfiguration of the passenger cabin using new seats) or the replacement of seat belts on existing passenger seats on part 25 (transport category) airplanes, unless coordinated with the policy making office using the issue paper process.

The FAA previously issued SAIB No. NM-04-37, recommending that the D-ring type seat belt attachment fittings be replaced with an improved design fitting.

Effect of Policy

The general policy stated in this document does not constitute a new regulation. The FAA individual who implements policy should follow this policy when applicable to a specific project. Whenever a proposed method of compliance is outside this established policy, that individual has to coordinate it with the policy issuing office using an issue paper. Similarly, if

the implementing office becomes aware of reasons that an applicant's proposal should not be approved, the office must coordinate its response with the policy issuing office.

Applicants should expect that the certificating officials will consider this information when making findings of compliance relevant to new certificate actions.

Conclusion

This policy addresses documenting an unreliable design of seat belt attachment fittings installed on passenger seats that the FAA has determined does not comply with § 25.601. This determination means that the FAA will not approve any additional installations of this design of seat belt attachment fittings, commonly referred to as "D-ring" attachment fittings, on passenger seats unless coordinated with the policy making office using the issue paper process.

/s/

Ali Bahrami

Attachment: Definition of Key Terms

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Definition of Key Terms

Table A-1 defines the use of key terms in this policy statement. The table describes the intended functional impact, and the formatting used to highlight these items.

- The term “must” refers to a regulatory requirement that is mandatory for design approval. Text communicating a requirement is in *italics*.
- The term “should” refers to instructions for a particular method of compliance. If an applicant wants to deviate from these instructions, he has to coordinate the alternate method of compliance with the Transport Standards Staff using an issue paper. There is no special text formatting used for methods of compliance.
- The term “recommend” refers to a recommended practice that is optional. Enclose recommendations in [] brackets.

Table A-1 Definition of Key Terms

	Regulatory Requirements	Acceptable Methods of Compliance	Recommendations
Language	Must	Should	Recommend
Format	<i>Italics</i>	Regular text (No special formatting)	[Square brackets]
Functional Impact	No Design Approval if not met	Alternative has to be approved by issue paper.	None, because it is optional

Examples from policy on Power Supply Systems for Portable Electronic Devices (PSS for PED):

- *Even though PSS for PED systems may use wiring that is produced for the consumer market, the wiring must meet the flammability requirements of § 25.869.*
- *Although multiple power control switches may be used (e.g., zonal control of system power), there should be a single master switch that allows for the immediate removal of power to the entire PSS for PED*
- *[We recommend that you provide a means of indication to enable the cabin crew to determine which outlets are in use or which outlets are available for use.]*