



# Federal Aviation Administration

---

---

## Memorandum

Date: August 31, 2016

To: Tom Groves, Manager, Standardization Branch, ANM-113

From: Suzanne Masterson, Manager, Airframe and Cabin Safety Branch,  
ANM-115

Subject: Revision to Comment Log for Advisory Circular 25.562-1B Change 1

---

---

Please revise the comment log for Advisory Circular (AC) 25.562-1B Change 1. On page 2 of the comment log, in the FAA disposition to comment number 3, include the underlined words as shown:

We disagree and did not revise the AC. In an installation where a 50<sup>th</sup> percentile male ATD has a glancing blow with or without an airbag, the 95<sup>th</sup> percentile male will have a solid head strike. This is not a consistent level of protection for the range of occupants and is specifically why we are removing the paragraph. If there is a glancing blow with the 50<sup>th</sup> percentile male ATD in a row-to-row installation with an airbag, then the applicant should retest with the target seat 3 inches closer, or other distance if data shows it to be more appropriate, to account for the larger occupants. This is the same guidance used for an installation without an airbag. (See Appendix 4 of the AC.) We added text to paragraph 5e(5)(a) and paragraph 1 of Appendix 4 to include that range of occupants needs to be addressed when using airbags.

Some readers were interpreting the FAA disposition to mean that no other method than moving the target seat 3 inches closer could be acceptable to demonstrate compliance in the event of a glancing blow with the 50<sup>th</sup> percentile male ATD. The purpose of this change is to acknowledge that the method in the AC for addressing range of occupants is one means but not the only means. We did not intend for the comment log to be interpreted as providing guidance that is more restrictive than the guidance in the AC. The added text clarifies that other means could be acceptable to the FAA if justified. The guidance provided in the AC, paragraph 5e(5)(a) and paragraph 1 of Appendix 4, states:

For installations that incorporate airbags or upper torso restraints, a similar approach could be used provided that the applicant conducts a specific analysis for two basic contact areas to assess HIC. Specific attention should be given to the range of occupants required for airbags.

**DISPOSITION OF PUBLIC COMMENTS**

AC 25.562-1B Change 1, *Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes*

Prepared by [John Sheldon](#), ANM-115

No.	Comment	Requested Change	Disposition
<b>Commenter: Mabel Lee</b>			
1	Check paragraph numbering on page 74, top of page. It says (e) and (f), but there was not a (a) thru (d). No mention of this changing.	Should it be (a) and (b)?	We agree and corrected the AC as requested.

No.	Comment	Requested Change	Disposition
<b>Commenter: Tom Knott</b>			
1	I am in support of the draft change to AC 25.562-1B. Much appreciated and nicely done.		Thank you.

No.	Comment	Requested Change	Disposition
<b>Commenter: MNG Jet</b>			
1	Some of the business aircrafts have separation walls very close to divan or extra seat or sometimes crew rest area has also separation. But the separation walls are not included in HIC? I think these damaged parts will also affect the injury.		The interior configurations must be considered when making the HIC showing of compliance. Side-facing seats, such as divans, are beyond the scope of this AC. The FAA has specific policy requiring special conditions for side-facing seats. Separation walls are included for HIC in that policy. No changes will be made to this AC.

## DISPOSITION OF PUBLIC COMMENTS

AC 25.562-1B Change 1, *Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes*

Prepared by [John Sheldon](#), ANM-115

No.	Comment	Requested Change	Disposition
<b>Commenter: SAE Aircraft Seat Committee</b>			
1	Page 12, paragraph 5.d.(1) Step 3 Commentary – Typo	Figure 5-2 should be 5-1	We agree and corrected the AC as requested.
2	Page 18, paragraph 5.e.(5) Commentary – Harmonization with AS wording.	Suggest adding currently agreed wording in AS8049C on definition of glancing blow.	We disagree because the requested change is outside the scope of the correction for addressing the range of occupants for row-to-row tests. We will consider this comment when we perform a major revision to this AC.
3	Page 18, paragraph 5.e.(5)  The FAA proposes to delete paragraph (d) and renumber paragraph (e) as new (d) in change 1. The SAE Seat Committee is concerned that the complete removal of this paragraph removes some guidance that has been found useful in the past and has tried to incorporate the missing guidance into the proposed revisions to paragraphs (a) and (b) below. Further, Industry finds that the lack of guidance for airbags intended to cushion the ATD head when contact is made with a surface is missing from this section of the Advisory Circular and proposes that the above text be added either as a new paragraph between (b) and (c), or appended to (b).	Suggest adding blue text.  <u><a href="#">For row to row seats incorporating airbags intended to cushion the ATD head when contact is made with the forward seat, a dynamic test performed as prescribed in § 25.562(b) with no head contact or HIC of 1000 or less addresses the range of occupants without any further considerations or substantiation. A glancing blow resulting in HIC of 1000 or less is acceptable and would not require additional analysis or testing using a more conservative test set up.</a></u>	We disagree and did not revise the AC. In an installation where a 50 <sup>th</sup> percentile male ATD has a glancing blow with or without an airbag, the 95 <sup>th</sup> percentile male will have a solid head strike. This is not a consistent level of protection for the range of occupants and is specifically why we are removing the paragraph. If there is a glancing blow with the 50 <sup>th</sup> percentile male ATD in a row-to-row installation with an airbag, then the applicant should retest with the target seat 3 inches closer, or other distance if data shows it to be more appropriate, to account for the larger occupants. This is the same guidance used for an installation without an airbag. (See Appendix 4 of the AC.) We added text to paragraph 5e(5)(a) and paragraph 1 of Appendix 4 to include that range of occupants needs to be addressed when using airbags.

**DISPOSITION OF PUBLIC COMMENTS**

AC 25.562-1B Change 1, *Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes*

Prepared by [John Shelden](#), ANM-115

No.	Comment	Requested Change	Disposition
<b>Commenter: SAE Aircraft Seat Committee</b>			
4	<p>Page 19, paragraph 5.e.(5)(a)</p> <p>This paragraph tells you to use HIC Lite, which addresses the range of occupants with as few tests as possible and the proposed change clarifies that HIC Lite can be used for seats equipped with upper torso restraints or airbags intended to cushion the head.</p>	<p>Suggest adding blue text.</p> <p>(a) In an effort to reduce the regulatory burden and both simplify and clarify the procedure for demonstrating compliance, the following procedure for row-to-row HIC has been developed. In the majority of cases, this procedure should allow demonstration of compliance for HIC with two tests. The procedure takes into account seat pitch, the relative position of the target seat and the occupied row behind it, and range of occupant sizes. The intent of this procedure is to provide default conditions that can be used in lieu of conducting several tests or performing lengthy analytical studies. The procedure is covered in detail in Appendix 4 but relies on two basic contact areas to assess HIC. These areas are the center of the seat back and the lateral edges of the seat back/armrest. <u><a href="#">This procedure can also be used for seats incorporating upper torso restraints as well as airbags solely intended to reduce the ATD head trajectory (as opposed to airbags intended to cushion the ATD head when contact is made with a surface).</a></u></p>	<p>We partially agree. The existing paragraph was written to simplify HIC analysis for most cases. There is no mention of airbags or upper torso restraints. Although the use of such features was not considered when developing this guidance, a similar analysis philosophy would be acceptable. The focus is on two contact areas of the seatback—the center and the side. In cases where an airbag or upper torso restraint is used, the head trajectory could be significantly altered to different areas of the seat back and, therefore, analysis would be required to determine the critical case tests for HIC. As with the lap belt only case, it would be reasonable to have two contact areas on the seat back for installations that have airbags or upper torso restraints. One criterion to specifically mention is that when airbags are used, the range of occupants is expanded to include the range of stature from a 2 year old child to a 95<sup>th</sup> percentile male. This is different from the typical 5<sup>th</sup> percentile female to 95<sup>th</sup> percentile range of occupants listed in Appendix 4 of the AC. We have added the following text to paragraph 5e(5)(a) and paragraph 1 of Appendix 4 to clarify the guidance:</p> <p>“For installations that incorporate airbags or</p>

**DISPOSITION OF PUBLIC COMMENTS**

AC 25.562-1B Change 1, *Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes*

Prepared by [John Sheldon](#), ANM-115

No.	Comment	Requested Change	Disposition
<b>Commenter: SAE Aircraft Seat Committee</b>			
			upper torso restraints, a similar approach could be used provided that the applicant conducts a specific analysis for two basic contact areas to assess HIC. Specific attention should be given to the range of occupants required for airbags.”
5	<p>Page 19, paragraph 5.e.(5)(b)</p> <p>This paragraph comes into use when you are unable to use paragraph (a) and tells you to account for the range of occupants in your showing of compliance. The changes proposed:</p> <ol style="list-style-type: none"> <li>1. Provide guidance that a glancing blow is insufficient to substantiate any test intended to demonstrate compliance for the range of occupants</li> <li>2. Provide guidance that the 95<sup>th</sup> percentile occupant is 3 inches taller than the 50<sup>th</sup> percentile ATD and that the 95<sup>th</sup> percentile occupant can either be addressed by rational analysis or test.</li> </ol>	<p>Suggest adding blue text.</p> <p>(b) Demonstration of compliance with the HIC should address seat pitch, occupant height (5th percentile female to the 95th percentile male), and yaw angle (up to but not necessarily limited to ±10 degrees). <u>The evaluation showing HIC of 1000 or less, must be from an ATD head impact that is a solid strike and not a glancing blow. Dynamic tests are conducted with a 49 CFR Part 572, Subpart B ATD (or equivalent) which is representative of a 50th percentile male occupant. For the purposes of addressing HIC for the height of a 95th percentile male occupant, 3 inches should be added to the ATD top of head when using rational analysis to select the critical HIC test to be conducted with a 49 CFR Part 572, Subpart B ATD (or equivalent). This dimension should also be used to address the range of occupants when a test, or analysis based on test, at the installed pitch using a 49 CFR Part 572,</u></p>	We agree and changed the AC as requested.

**DISPOSITION OF PUBLIC COMMENTS**

AC 25.562-1B Change 1, *Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes*

Prepared by [John Sheldon](#), ANM-115

No.	Comment	Requested Change	Disposition
<b>Commenter: SAE Aircraft Seat Committee</b>			
		<p><a href="#">Subpart B ATD (or equivalent) results in a glancing blow.</a> Once a seat back is qualified for HIC, any seat could be installed aft of it, provided the installation limitations result in comparable conditions to those under which the seat was tested.</p>	
6	<p>Page 19, paragraph 5.e.(5)(d)</p> <p>The changes proposed to (d) harmonize with FAA policy ANM-115-05-14 by including the ability to directly test the installed setback for a front row seat with a 50<sup>th</sup> percentile ATD, obtaining HIC of 1000 or less and not do anything more to address the range of occupants. It also clarifies that seat furniture must still consider the complete range of occupants.</p>	<p>Suggest adding blue text.</p> <p>d. For front row seats (those seats that are located directly aft of a partition, monument, or any other commodity certificated to 9g, <a href="#">excluding seat related furniture such as consoles and walls that typically make up pod seats</a>), simpler methods of compliance are possible. <a href="#">Using the methods defined below addresses the range of occupants without any further considerations or substantiation.</a></p> <ol style="list-style-type: none"> <li>1. <a href="#">Perform dynamic testing as prescribed in § 25.562(b) with no head contact or HIC of 1000 or less. A glancing blow resulting in HIC of 1000 or less is acceptable and would not require additional analysis or testing using a more conservative test set up.</a></li> <li>2. Perform a dynamic test <a href="#">in accordance with Appendix 4, Paragraph 2</a> to determine the head path arc of the Title 49 CFR part 572, Subpart B ATD or equivalent and install</li> </ol>	<p>We partially agree. The intent of the AC and Policy Memorandum ANM-115-05-14 is to limit the range of occupant evaluation for HIC to that strictly covered by the test in § 25.562(b). We disagree that using the methods addresses the 5<sup>th</sup> percentile female to 95<sup>th</sup> percentile male range of occupants. We have revised the text with the proposed edits, except for inclusion of “Using the methods defined below addresses the range of occupants without any further considerations or substantiation.”</p>

## DISPOSITION OF PUBLIC COMMENTS

AC 25.562-1B Change 1, *Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes*

Prepared by [John Sheldon](#), ANM-115

No.	Comment	Requested Change	Disposition
<b>Commenter: SAE Aircraft Seat Committee</b>			
		the seat such that no contact by the ATD head would occur. In this case, we would not require more analyses or repositioning of the seat.  <b>3.</b> For seats that incorporate head path....	
7	Page 14	Fix the typo to say "Question: Does the seat with the narrowest leg spacing have an interface load <b>more</b> than 80% of the highest interface <b>load</b> of this group".	We agree and have corrected the AC as requested.

No.	Comment	Requested Change	Disposition
<b>Commenter: Boeing</b>			
1	Page 12, Step 3 The proposed text states: “ <b>Step 3:</b> For each group of seats (see Figure 5-2):” This seems to be a typographical error.	We recommend revising the text as follows: “ <b>Step 3:</b> For each group of seats (see <a href="#">Figure 5-1</a> <del>Figure 5-2</del> ):”	We agree and have corrected the AC as requested.

## DISPOSITION OF PUBLIC COMMENTS

AC 25.562-1B Change 1, *Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes*

Prepared by [John Sheldon](#), ANM-115

No.	Comment	Requested Change	Disposition
<b>Commenter: Boeing</b>			
2	<p>Page 19, paragraph (b)</p> <p>The text states:</p> <p>“Demonstration of compliance with the HIC should address seat pitch, occupant height (5<sup>th</sup> percentile female to the 95<sup>th</sup> percentile male), and yaw angle (up to but not necessarily limited to <math>\pm 10</math> degrees). Once a seat back is qualified for HIC, any seat could be installed aft of it, provided the installation limitations result in comparable conditions to those under which the seat was tested.”</p> <p>If not limited, then any yaw angle beyond <math>\pm 10</math> degrees could be considered.</p>	<p>We recommend revising the text as follows:</p> <p>“Demonstration of compliance with the HIC should address seat pitch, occupant height (5<sup>th</sup> percentile female to the 95<sup>th</sup> percentile male), and yaw angle (up to <del>but not necessarily limited to</del> <math>\pm 10</math> degrees, <u>and any angle in between</u>). Once a seat back is qualified for HIC, any seat could be installed aft of it, provided the installation limitations result in comparable conditions to those under which the seat was tested.”</p>	<p>We agree and have corrected the AC as requested.</p>

**DISPOSITION OF PUBLIC COMMENTS**

AC 25.562-1B Change 1, *Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes*

Prepared by [John Shelden](#), ANM-115

No.	Comment	Requested Change	Disposition
<b>Commenter: Boeing</b>			
3	<p>Page 20, continuation of paragraph (d)2</p> <p>The proposed text states:</p> <p>“[...] When using these dimensions, applicants should coordinate with the FAA or designee, as appropriate, and provide suitable justification for FAA evaluation. No dynamic test is needed for HIC or head path arc for seats that follow a design philosophy that includes the use of metallic components in the primary load path from the seat beams through the seat legs [...]”</p> <p>Seats with composite structure are being introduced to the market. Those seats are effectively eliminated from consideration for using this MOC, even though a composite structure could provide similar, or better, structural integrity than metal structure.</p> <p>Out proposal intents is to account for current and future seat designs and materials. Specifying metallic components only effectively eliminates seats with composite structure for consideration.</p>	<p>We recommend revising the text as follows:</p> <p>“[...] When using these dimensions, applicants should coordinate with the FAA or designee, as appropriate, and provide suitable justification for FAA evaluation. No dynamic test is needed for HIC or head path arc for seats that follow a design philosophy that includes the use of metallic components, <u>or other materials that can be demonstrated to minimize head path</u>, in the primary load path from the seat beams through the seat legs[...]</p>	<p>We disagree because the requested change is outside the scope of the correction for addressing the range of occupants for row-to-row tests. We will consider this comment when we perform a major revision to this AC.</p> <p>This AC is one means of compliance (MOC) but not the only means. Applicants can negotiate additional MOCs with the FAA through a project-specific issue paper.</p>