

DISPOSITION OF PUBLIC COMMENTS

Policy Statement PS-ANM-25-20, High-Energy Wide-Area Blunt Impact for Composite Structures

Prepared by Mark Freisthler, ANM-115

No.	Comment	Requested Change	Disposition
Commenter: Airbus			
1	<p>Generic comment:</p> <p>This policy memo requires an investigation on HEWABI to be in compliance to §25.571(a) for Category 5 damage. Requiring compliance for 25.571 in the context of Category 5 given in AC 20-107B is not in line with the definition of Category 5. The regulatory link should be made to §25.1529 Instruction for Continued Airworthiness.</p>	<p>See below comments where 25.571 is consistently removed.</p> <p>Instead §25.1529 ICA is referred to as basic regulation.</p>	<p>The FAA does not concur and we did not remove the references to § 25.571.</p> <p>Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or <i>accidental damage</i>, will be avoided throughout the operational life of the airplane” (emphasis added). While this policy does not require that Category 5 damage be considered as part of the damage-tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b), applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).</p> <p>Section 25.1529 only requires the applicant to issue instructions for continued airworthiness and does not directly address the need to conduct an evaluation of accidental damage. Appendix H25.4, Airworthiness Limitations section (ALS), does require each mandatory structural inspection approved under § 25.571 to be included in the ALS. This policy clarifies that mandatory conditional inspections also need to be included in the ALS.</p>
2	<p>Generic comment:</p> <p>This policy memo requires referencing conditional inspections for Category 5 HEWABI events in the ALS. By doing</p>	<p>See below comments where the reference to ALS is consistently removed.</p>	<p>The FAA does not concur and we did not change the document.</p> <p>Appendix H25.4, Airworthiness Limitations section (ALS), does require each mandatory structural</p>

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	this, the conditional inspection becomes a mandatory inspection. This is not in line with current practice for the recently certified CFRP [carbon fiber reinforced polymer] fuselages and also not in line with practice for “abnormal events”. These types of inspections are usually covered in dedicated chapter of the AMM.		inspection approved under § 25.571 to be included in the ALS. This policy clarifies that mandatory conditional inspections also need to be included in the ALS. It is acceptable to include the requirement to conduct a conditional inspection in the ALS which references the dedicated chapter in the aircraft maintenance manual (AMM).
3	<p>Generic comment:</p> <p>In line with the definition of Category 5 damage in AC 20-107B, there is no need for regulatory compliance data that substantiate the structure. Cat 5 events are treated as abnormal events potentially triggering conditional inspections outside the design and certification exercise.</p>	See below comments on removing links to justification and documentation needed.	<p>The FAA does not concur, and no changes were made to the policy.</p> <p>Advisory Circular (AC) 20-107B provides an acceptable means of compliance to § 25.571 and other referenced regulations. However, an AC is not a regulation and would not supersede a regulatory requirement. While AC 20-107B does reference Category 5 damage as severe damage created by anomalous ground or flight events which is not covered by design criteria or by the structural substantiation procedures, the AC also states that suitable conditional inspections must be defined. The regulatory requirement (§ 25.571(a)) referenced in the AC is also referenced in this policy.</p>
4	<p>Summary:</p> <p>To show compliance with Title 14, Code of Federal Regulations (14 CFR) §25.571(a), the applicant must show, among other things, that catastrophic</p>	<p>Replace by wording from AC20-107B like:</p> <p>In line with AC20-107B, Category 5 accidental damage caused by high-energy wide-area blunt impact</p>	<p>The FAA does not concur and we did not make the suggested change to the document. However, for clarification we added information to the policy. (See note below in this disposition).</p> <p>Section 25.1529 only requires the applicant to issue</p>

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	<p>failure due to accidental damage will be avoided for the life of the airplane. The applicant is required to consider possible damage scenarios when evaluating accidental damage that could result in catastrophic failure. One of these damage scenarios the applicant should assess is accidental damage caused by high-energy wide-area blunt impact (HEWABI) events.</p> <p>HEWABI as one of the possible Cat 5 damages should not be part of any §25.571 requirement. §25.571 (a) is quite explicit what need to be addressed under this requirement to avoid catastrophic failure (...This evaluation must be conducted in accordance with the provisions of paragraphs (b) and (e) of this section, except as specified in paragraph (c) of this section.....). Paragraph (b) is the damage tolerance assessment, which is clearly excluded from Cat 5 damage in AC20-107B. Paragraph (e) are the discrete source damage events, obvious to the crew. Paragraph (c) is covering the fatigue safe life items.</p> <p>Reference to §25.1529 would be more appropriate.</p> <p>Cat 5 is defined in the AC20-107B as</p>	<p>(HEWABI) events must be addressed by the applicant. Any resulting Instructions for Continued Airworthiness must be handled under §25.1529.</p>	<p>instructions for continued airworthiness and does not directly address the need to conduct an evaluation of accidental damage. Appendix H25.4, Airworthiness Limitations section (ALS), does require each mandatory structural inspection approved under § 25.571 to be included in the ALS. This policy clarifies that mandatory conditional inspections also need to be included in the ALS.</p> <p>The commenter notes that paragraph (e) of § 25.571 addresses discrete source damage, but that paragraph addresses only discrete source damage that occurs <u>in flight</u>. Thus the requirement of that paragraph is that the airplane is capable of continued safe flight and landing after that damage occurs. Because HEWABI (the subject of this policy) is associated with events which may result in undetected discrete source damage that occurs on the ground, there is no requirement that the airplane be capable of continued safe flight and landing after the event. However, that makes an inspection imperative after such an event and prior to the airplane’s next flight to insure that undetected discrete damage has not occurred. While these events do not fit into the “scheduled inspections” determined by the damage growth analysis required by paragraph (b), unscheduled inspections are necessary following these events to meet the primary objective of § 25.571 -- that</p>

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	<p>“anomalous damage, known to operations”. It is like any other abnormal event (hard landing, heavy turbulence, tyre burst...) to be handled case by case, usually covered in a dedicated Maintenance Manual section for example the AMM Chapter 5.51. This is Airbus interpretation of the AC20-107B §8.a.6 (b):</p> <p>By definition, Category 5 damages do not have associated damage tolerance design criteria or related structural substantiation tasks. Category 5 damages will require suitable inspections based on engineering assessment of the anomalous service event, and appropriate structural repair and/or part replacement, prior to the aircraft re-entering service.</p>		<p>catastrophic failure due to fatigue, corrosion, manufacturing defects or <u>accidental damage</u> be avoided throughout the <u>operational life</u> of the airplane.</p> <p>An advisory circular (AC) is not a substitute for a regulation. The purpose of an AC is to provide guidance materials to the aviation community. The guidance can be methods, procedures, or practices acceptable to the FAA Administrator for complying with regulations.</p> <p>(NOTE: We added the italicized information below to the policy to further clarify the regulatory requirements):</p> <p><i>The applicant does not need to consider Category 5 damage as part of the damage-tolerance evaluation used to establish scheduled inspections; however, the applicant should consider the potential effect of Category 5 accidental damage, develop conditional inspections, and include them in the ALS of the ICA per § 25.571(a)(3).</i></p>
5	<p>Summary:</p> <p>To ensure that any potentially catastrophic damage resulting from a HEWABI event is detected and repaired, applicants must provide appropriate conditional inspection instructions, or other procedures, to be implemented at the occurrence of such</p>	<p>Please replace by sentence:</p> <p>To ensure that any potentially catastrophic critical damage resulting from a HEWABI event is detected and repaired, applicants must provide appropriate conditional inspection instructions, or other procedures, to be</p>	<p>The FAA does not concur, and the document was not revised as suggested.</p> <p>HEWABI is not a type of damage, but an impact event which may result in damage (of any category described in Advisory Circular (AC) 20-107B).</p> <p>Section 25.571 applies to this policy because it concerns accidental damage which could result in</p>

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	<p>impact events as required per § 25.571(a)(3).</p> <p>See comment #4 for the Airbus position that HEWABI as one of the possible Cat 5 damages should not be part of any §25.571 requirement. In addition, the ALS is [not] and has never been the correct means to address such an abnormal event (neither done for hard landing/ gust and other abnormal events.</p> <p>Also the word “catastrophic” is not appropriate when the link to §25.571 is removed. Today practice for composite fuselages is to provide instructions to address the event, any impacts found during follow up inspections are treated as any other damage. The ICA is stepwise: first verify if there has been an HEWABI event, then perform conditional inspections, and then consider any potential damages found.</p>	<p>implemented at the occurrence of such impact events as required per § 25.571(a)(3).</p>	<p>catastrophic failure of structure.</p>
6	<p>Summary:</p> <p>HEWABI events (e.g. impacts by service vehicles) are impacts that are spread over a large area that may cause considerable structural damage.</p> <p>The word “considerable” is not in line with</p>	<p>Please replace by:</p> <p>HEWABI events (e.g. impacts by service vehicles) are impacts that are spread over a large area that may cause considerable internal structural damage.</p>	<p>The FAA partially concurs with this comment.</p> <p>We agree that “<i>considerable</i>” is a term that is not consistent with wording used in § 25.571 and have revised the document as presented below. We revised the sentence as follows:</p> <p>HEWABI events (e.g. impacts by service vehicles)</p>

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	the experiences that Industry obtained during the most recent CFRP fuselage projects, and it could lead to wrong impression given about the robustness of CFRP structures.		are impacts that are spread over a large area and convey sufficient energy to cause potentially <i>catastrophic</i> structural damage. Use of the phrase “convey sufficient energy to cause potentially <i>catastrophic</i> structural damage” allows for HEWABI events that range in criticality with an emphasis on those of greatest concern (i.e., those with damage that require immediate attention).
7	<p>Definition §2[3].2:</p> <p>However, Category 5 damage must be considered as part of the required evaluation under § 25.571(a) of any accidental damage that may result in catastrophic failure.</p> <p>See comment nr. 4 for the Airbus position that the possible Cat 5 damages should not be considered per any §25.571 requirement.</p>	Please delete the sentence.	<p>The FAA does not concur and we have not deleted the sentence.</p> <p>As discussed in response to Airbus comment 4, we added information to the Policy section for clarification. (The subject definition was renumbered to 3.2).</p> <p>Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or <i>accidental damage</i>, will be avoided throughout the operational life of the airplane” (emphasis added). While this policy does not require that Category 5 damage be considered as part of the damage-tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b), applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).</p>

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8	<p>Definition §1:</p> <p>In composite structure, HEWABI events may cause considerable structural damage with little or no external indication, and are associated with Category 5 damage.</p> <p>See comment #6 for the word “considerable”.</p> <p>The wording “with little or no external indication” is not considered correct. There are basically 3 triggers to identify a HEWABI event: clearly visible and noticed during preflight check, event obvious to persons in the area or self-evident by the event itself. That is why the mentioned words should be either expanded or removed.</p>	<p>Please replace by:</p> <p>In composite structure, HEWABI events may cause internal structural damage and are associated with Category 5 damage.</p>	<p>The FAA does not concur with this comment and did not change the policy as requested. One purpose of this policy is to emphasize that a HEWABI event <u>may</u> result in damage that is not externally visible; so the event-driven inspections need to occur whether or not external damage is evident. We agree with the commenter’s stated triggers to identify a HEWABI event; however, the term “external indication” refers to visible exterior indication of damage on the composite surface, not to the triggers to identify a HEWABI event. A major concern with a blunt impact over wide areas is that composite structures have the ability to flex and spring back leaving little or no indication of external damage.</p>
9	<p>Current Regulatory and Advisory Material</p> <p>The following 14 CFR regulations apply:</p> <ul style="list-style-type: none"> • § 25.571, <i>Damage-tolerance and fatigue evaluation of structure</i> <p>The reference to §25.571 should be removed, as being not applicable, see comment #4. Also the reference to the AC25.571-1D should be removed for the same reasons.</p>	<p>Please remove these references.</p>	<p>The FAA does not concur, and references to § 25.571 have not been removed from the policy.</p> <p>Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or <i>accidental damage</i>, will be avoided throughout the operational life of the airplane” (emphasis added). While this policy does not require that Category 5 damage be considered as part of the damage-tolerance evaluation used to establish scheduled inspections or other procedures</p>

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			as required by § 25.571(b), applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).
10	<p>Background:</p> <p>HEWABI events can occur during normal airplane operations.</p> <p>Airbus position is that HEWABI events covered under Cat 5, mainly the ground vehicle impacts, are abnormal events and cannot be considered as normal airplane operation events. So far, Airbus has communicated the HEWABI event to all operators in this context.</p>	Please delete the sentence	<p>The FAA partially concurs with this comment.</p> <p>We used the term “normal” as a synonym for “routine.” We did not intend to say that ground vehicle collisions with airplanes were normal events. We changed the policy to replace the word “normal” with “routine.”</p>
11	<p>Background:</p> <p>As a result, there may be minimal exterior indications of damage (e.g., dents, scratches, tears), while significant damage may be present in the internal structures (e.g., frames, ribs, stiffeners, spars, and shear ties), which reacted the high energy and corresponding forces.</p> <p>The word “significant” is not in line with the experiences that Industry obtained during the most recent CFRP fuselage projects, and it could lead to wrong impression given about the robustness of</p>	<p>Please change sentence in:</p> <p>As a result, there may be minimal exterior indications of damage (e.g., dents, scratches, tears), while significant internal damage may be present in the internal structures (e.g., frames, ribs, stiffeners, spars, and shear ties), which reacted the high energy and corresponding forces.</p>	<p>We partially concur with this comment.</p> <p>“<i>Significant</i>” is a term that is not consistent with wording used in § 25.571. Therefore we have revised the document as presented below. Use of the phrase “<i>may cause catastrophic structural damage</i>” allows for HEWABI events that range in criticality with an emphasis on those of greatest concern (i.e., those with damage that require immediate attention).</p> <p>To be in line with the regulatory reference to § 25.571, the term <i>significant</i> will be replaced with <i>catastrophic</i>. The text now reads:</p> <p><i>As a result, there may be minimal exterior indications of damage (e.g., dents, scratches,</i></p>

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	CFRP structures.		<i>tears</i>), while <i>catastrophic</i> damage may be present in the internal structures (e.g., frames, ribs, stiffeners, spars, and shear ties), which reacted the high energy and corresponding forces. (Emphasis added to show replacement of term).
12	<p>Background:</p> <p>....so to comply with § 25.571(a), other precautionary steps must be taken by the applicant to avoid catastrophic failures.</p> <p>No compliance is expected against §25.571(a), see comment #4.</p> <p>There are no precautionary steps to be taken, conditional inspections are to be defined in line with current practice.</p>	<p>Please change sentence in:</p> <p>....so to comply with § 25.571(a), in line with §25.1529, ICA should contain conditional inspections. other precautionary steps must be taken by the applicant to avoid catastrophic failures.</p>	<p>The FAA does not concur and we did not change the sentence.</p> <p>Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or <i>accidental damage</i>, will be avoided throughout the operational life of the airplane” (emphasis added).</p> <p>While this policy does not require that Category 5 damage be considered as part of the damage-tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b), applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).</p>
13	<p>Background:</p> <p>Such events are typically obvious to personnel involved in the event, either through the sound of creating structural damage or through personally experiencing</p>	<p>Please change sentence in:</p> <p>Such events are typically obvious to personnel involved in the event, either clearly visible and noticed during preflight check, or the event obvious to persons in the area, or self-evident by</p>	<p>The FAA does not concur with this comment and we have not changed the sentence.</p> <p>The Background section is a general discussion of the subject of the policy memo and does not convey policy requirements. As such, the discussion of sound as being one indicator that a</p>

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	<p>the forces involved.</p> <p>The wording “sound of creating structural damage” is rather debatable.</p> <p>There are basically 3 triggers to identify a HEWABI event: clearly visible and noticed during preflight check, event obvious to persons in the area, or self-evident by the event itself. That is why the mentioned words should be either expanded or removed.</p>	<p>the event itself. through the sound of creating structural damage or through personally experiencing the forces involved.</p>	<p>HEWABI event has occurred is appropriate.</p>
14	<p>Background:</p> <p>For more discussion on how DAHs and operators should jointly share the responsibility for ensuring that potentially catastrophic damage caused by HEWABI events are detected through the ICA process, see Appendix C.</p> <p>The word “catastrophic” is not in line with the experiences that Industry obtained during the most recent CFRP fuselage projects, and it could lead to wrong impression given about robustness of CFRP structure. Also by removing the link to §25.571, the link to catastrophic failure is ensured.</p> <p>The wording “jointly share the responsibility” is not appropriate for a</p>	<p>Remove wording “catastrophic“ and replace by critical from the sentence.</p> <p>Consider rewriting this sentence to either remove all the links to operator responsibilities, or alternatively include operator responsibility in the Policy chapter.</p>	<p>The FAA does not concur with this comment and we have not changed the sentence.</p> <p>We do not agree that a HEWABI event could not result in catastrophic damage. The Background section is a general discussion of the subject of the policy memo and does not convey policy requirements. As such, the discussion of potentially catastrophic damage occurring during a HEWABI event is appropriate.</p> <p>The statement including the wording “jointly share the responsibility” refers the reader to Appendix C, which contains recommendations that are not part of the policy. Appendix C represents best practices that the FAA encourages, but does not require, and does not convey policy requirements.</p>

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	policy memo that is mainly providing instructions to DAH as applicant (see policy wording). So either the policy text is adopted to put the responsibility not only with the DAH as applicant, or all activities linked to operators should be removed.		
15	<p>Policy</p> <p>Section 25.571(a) requires that applicants conduct an evaluation of the strength, detail design, and fabrication of the structure to show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or accidental damage will be avoided throughout the operational life of the airplane. Section 25.571(a)(3) requires applicants to establish inspections or other procedures to prevent such catastrophic failure from those events, and include them in the Airworthiness Limitations Section (ALS) of the Instructions for Continued Airworthiness required by § 25.1529 and Appendix H to part 25. While the ALS has historically focused on damage tolerance inspections to address fatigue, § 25.571(a)(3) also requires inspections or other procedures to address accidental damage from HEWABI events.</p> <p>This reference to §25.571a and</p>	<p>Please replace by wording from AC20-107B like:</p> <p>In line with AC20-107B, Category 5 accidental damage caused by high-energy wide-area blunt impact (HEWABI) events must be addressed by the applicant. Any resulting Instructions for Continued Airworthiness must be handled under §25.1529.</p>	<p>The FAA does not concur and we have not changed the wording.</p> <p>As discussed in response to Airbus comment 4, we added information to the Policy section for clarification.</p> <p>As the commenter points out, § 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or accidental damage, will be avoided throughout the operational life of the airplane” (emphasis added). While this policy does not require that Category 5 damage be considered as part of the damage-tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b), applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).</p>

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	25.571(a)(3) is not appropriate and not relevant , see comment 4 and 5.		
16	<p>Policy</p> <p>For composite structure, the applicant should consider HEWABI-related events.</p> <p>The wording “applicant” is not appropriate for a policy memo that is providing instructions to DAH as applicant and also tasks listed for operators throughout this memo. So either the policy text is adopted to put the responsibility not only with the DAH as applicant but also to include the operators, or all activities and wording linked to operators should be removed.</p>		<p>The FAA does not concur and we have not changed the document.</p> <p>This policy applies to part 25 regulations only. As such, the term applicant is appropriate.</p>
17	<p>Policy §1</p> <p>Drawing from past experience with airplanes in similar operational environments, provide guidelines, inspection instructions, or other safety management procedures as necessary to prevent catastrophic failure that will enable operators to distinguish the level of damage that is covered under the substantiating data for § 25.571(b) (damage Categories 1 through 4) and the level of damage that is outside the scope of the DTE (damage Category 5).</p>	<p>Please change sentence into:</p> <p>Drawing from past experience with airplanes in similar operational environments, provide guidelines, inspection instructions, or other safety management procedures as necessary to prevent catastrophic failure that will enable operators to identify distinguish an event as a potential HEWABI Category 5 event. level of damage that is covered under the substantiating data for § 25.571(b) (damage Categories 1 through 4) and the level of damage that</p>	<p>The FAA does not concur and we did not delete the information per the commenter’s request.</p> <p>As discussed in response to Airbus comment 4, we added information to the policy for clarification.</p> <p>Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or <i>accidental damage</i>, will be avoided throughout the operational life of the airplane” (emphasis added). While this policy does not require that Category 5 damage be considered as part of the damage-tolerance evaluation used to establish scheduled inspections or other procedures</p>

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	<p>The wording “to prevent catastrophic failure” is not in line with the experiences that Industry obtained during the most recent CFRP fuselage projects, and it could lead to wrong impression given about robustness of CFRP structure. Also by removing the link to 25.571, the link to catastrophic failure is ensured.</p> <p>Also the wording “level of damage” is not in line with industry practice on CFRP fuselages. The ICA are focusing on a 3 step approach: first verify if there has been an HEWABI event, then perform conditional inspections, and then consider any potential damages found. So §1 should be linked to identifying the HEWABI event.</p>	<p>is outside the scope of the DTE (damage Category 5).</p>	<p>as required by § 25.571(b), applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).</p> <p>Regarding the wording “level of damage,” the policy is addressed to the applicant developing the ICA. You are correct that the contents of the ICA should include the items you mention, but the ICA contents are the outcome of the work by the applicant (policy §3). In creating the inspections, the applicant considers the level of damage, etc.</p>
18	<p>Policy §2</p> <p>Establishing a limitation in the ALS which sets the requirement for conditional inspections when a HEWABI event occurs, and indicating how the operator can identify HEWABI events so that the airplane is removed from service until the appropriate necessary maintenance is completed.</p> <p>Per comment 5, no limitation in the ALS</p>	<p>Please change sentence as:</p> <p>Establishing a limitation in the ALS which sets the requirement for conditional inspections when a HEWABI event occurs, and indicating how the operator can identify HEWABI events so that the airplane is removed from service until the appropriate necessary maintenance can be defined is completed.</p>	<p>The FAA does not concur and we have not changed the sentence.</p> <p>The purpose of this policy is to clarify that conditional inspection(s) are mandatory after a HEWABI event.</p> <p>Section 25.571(a)(3) states, “Based on the evaluation required by this section, inspections or other procedures must be established, as necessary, to prevent catastrophic failure, and must be included in the Airworthiness Limitations section of the Instructions for Continued Airworthiness</p>

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	should be mentioned in the Policy. Also the airplane removal from service until the maintenance is completed is not necessarily the case.		required by § 25.1529.”
19	<p>Appendix B Background Information</p> <p>The high energies involved in HEWABI events can cause multiple failures within the structure, both at the impact location and in reacting structures that are some distance from the contact area.</p> <p>The wording “multiple failures” is not in line with the experiences that Industry obtained during the most recent CFRP fuselage projects, and it could lead to wrong impression given about robustness of CFRP structure.</p>	<p>Change sentence in:</p> <p>The high energies involved in HEWABI Category 5 events can cause damage multiple failures within the structure, both at the impact location and in reacting structures that are some distance from the contact area.</p>	<p>The FAA concurs with the commenter and will replace the words “multiple failures” with the word “damage”.</p>
20	<p>Appendix B Summary of AC20-107B</p> <p>As such, the applicant is responsible for defining the boundary between Category 5 damage and other damages that were considered when conducting their damage tolerance evaluation and establishing inspection and maintenance requirements.</p> <p>Cat 5 events should be identified; the applicant should distinguish between events leading to the damage.</p>	<p>Change sentence in:</p> <p>As such, the applicant is responsible for defining the boundary between Category 5 events damage and other events damages that were considered when conducting their damage tolerance evaluation and establishing inspection and maintenance requirements.</p>	<p>The FAA does not concur with this comment and we have not changed the sentence.</p> <p>The category of damage is not an event.</p>

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21	<p>Appendix B Summary of AC20-107B</p> <p>However, they are expected to include Category 5 damage when considering accidental damage in compliance with § 25.571(a).</p> <p>§25.571 is not applicable (see comment #4) and is replaced by §25.1529.</p>	<p>However, they are expected to include Category 5 damage when considering ICA per §25.1529 accidental damage in compliance with § 25.571(a).</p>	<p>FAA does not concur with this comment and we have not changed the sentence.</p> <p>The requirement to address accidental damage is detailed in § 25.571(a), not § 25.1529.</p>
22	<p>Appendix B Composites structure response</p> <p>.....are documented to support conditional inspections. ...</p> <p>As for damage-tolerant structure, critical HEWABI data should include balanced structural designs and analyses supported by tests.</p> <p>Referring to documentation, analysis supported by tests implies that formal structural substantiation is requested. This is not in line with the definition of Cat 5 events. See also comment 3.</p> <p>Also the last sentence brings no further added value to the background discussion.</p>	<p>Change sentence in:</p> <p>As a result, work will be performed by the manufacturer to develop relationships between damage caused by a HEWABI event, dent measurements following springback, and any visual clues of major damage (e.g., distress in bolt holes) are documented to support conditional inspections.</p> <p>As for damage-tolerant structure, critical HEWABI data should include balanced structural designs and analyses supported by tests.</p>	<p>The FAA does not fully concur with the comment. However we did delete the requested information.</p> <p>Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or accidental damage, will be avoided throughout the operational life of the airplane” (emphasis added). While this policy does not require that Category 5 damage be considered as part of the damage-tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b), applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).</p> <p>The inspection methods and extent of the area to be inspected should be based on test data, and any tests performed should be documented. The FAA expects applicants to maintain documentation of this test data as part of the substantiation data for the ICA.</p>

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23	<p>Appendix C</p> <p>In order for operators to develop their safety management practices, the DAH should provide the appropriate conditional inspections or other actions an operator should use to address the occurrence of a HEWABI event in their provided maintenance manual, with appropriate references in the ALS.</p> <p>ALS not to be considered, see comment #5.</p>	<p>Change sentence in:</p> <p>In order for operators to develop their safety management practices, the DAH should provide the appropriate conditional inspections or other actions an operator should use to address the occurrence of a HEWABI event in their provided maintenance manual, with appropriate references in the ALS.</p>	<p>The FAA does not concur and we have not removed the ALS reference in Appendix C of this policy.</p> <p>The purpose of this policy is to clarify that conditional inspection(s) are mandatory after a HEWABI event.</p> <p>Section 25.571(a)(3) states, “Based on the evaluation required by this section, inspections or other procedures must be established, as necessary, to prevent catastrophic failure, and must be included in the Airworthiness Limitations section of the Instructions for Continued Airworthiness required by § 25.1529” (emphasis added).</p>
24	<p>Appendix C</p> <p>Title: Recommendations On How the DAH and Operators Should Jointly Address HEWABI Events</p> <p>The wording “jointly address” is not appropriate for a policy memo that is mainly providing instructions to DAH as applicant (see Policy wording “For composite structure, the applicant should consider HEWABI-related events by...”). So either the policy text is adopted to put the responsibility not only with the DAH as applicant, or all activities linked to operators should be removed.</p>	<p>Either update title and remove all tasks linked to the operator, or adopt the applicability of the policy to include the operators.</p>	<p>The FAA does not fully concur; however, we did change the title of Appendix C to <i>Recommendations on How a DAH Can Interface With Operators to Jointly Address HEWABI Events</i> to be clearer.</p> <p>The purpose of this policy is to clarify that conditional inspection(s) are mandatory after a HEWABI event per § 25.571(a)(3) and provide guidance for acceptable means of compliance for including the inspections in airworthiness limitations.</p> <p>Appendix C contains recommendations (or best practices) for how design approval holders and operators should work together to promote</p>

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			<p>effective responses to HEWABI events.</p> <p>Note: Appendices B and C are provided as additional information on the subject of the policy only. Please refer to the section of the document titled “POLICY” for the FAA’s acceptable method of compliance to the related regulations.</p>
25	<p>Appendix C</p> <p>Data collected in HEWABI engineering studies should be documented and shared with internal and external maintenance support organizations.</p> <p>Referring to documentation implies that formal structural substantiation is requested. This is not in line with the definition of Cat 5 events. Moreover, any of this type of documentation is company proprietary data that cannot be shared with external organizations.</p>	Please delete sentence	<p>The FAA does not concur and did not delete the sentence. However, we revised the sentence as follows:</p> <p><i>The DAH should document and share data collected in HEWABI engineering studies with maintenance support organizations internal and external to the DAH.</i></p> <p>Appendix C contains recommendations on how applicants and operators should work together to promote effective responses to HEWABI events. The purpose of this policy is to clarify that conditional inspection(s) are mandatory after a HEWABI event per § 25.571(a)(3) and provide guidance for acceptable means of compliance.</p> <p>The inspection methods and extent of inspection area should be based on test data, and any tests performed should be documented. The FAA expects applicants to maintain documentation of this test data as part of the substantiation data for the ICA.</p> <p>It is up to each individual company to decide</p>

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			whether to share data or not. The FAA encourages data sharing for the continued development and advancement of the field of composite structures.
26	<p>Appendix C</p> <p>Notes should be added to the SRM to ensure ADL are not applied to a HEWABI event.</p> <p>It is not clear why after disposition of the damage, ADL cannot be used.</p>	<p>Clarify why this sentence is included in Appendix C.</p>	<p>The FAA revised the sentence to read: <i>The FAA recommends adding notes to the SRM to ensure ADL are not applied to a HEWABI event.</i></p> <p>To clarify why this sentence is included in Appendix C, the allowable damage limits (ADL) in the structural repair manual (SRM), derived from static strength, fatigue, and damage tolerance data, may not be accurate for HEWABI events. This is because the events causing Category 5 damage are beyond those that are addressed by structural design and substantiation. Since the ADL may not be accurate in the case of HEWABI events, the FAA recommends adding notes to the SRM to ensure the ADL are not applied in the case of a HEWABI event.</p>
27	<p>Appendix C</p> <p>It should also provide conservative estimates of the vehicle collisions needed to cause Category 5 damage in specific locations on the airplane using reasonable scenarios when a HEWABI event may occur (e.g., approximate vehicle size,</p>	<p>Change sentence in:</p> <p>It should also provide criteria to identify potential HEWABI Category 5 events to be triggering the conditional inspections. conservative estimates of the vehicle collisions needed to cause Category 5 damage in specific locations</p>	<p>The FAA does not concur and we have not removed the information in Appendix C.</p> <p>As we stated above, Appendix C contains recommendations on how applicants and operators should work together to promote effective responses to HEWABI events. The purpose of this policy is to clarify that conditional inspection(s) are</p>

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	<p>weight, and speed as a function of structural location.) It should also identify the full range of structural areas that could be affected by a HEWABI event, including the contact zone and adjacent structural reinforcements that react the loads</p> <p>This is very ambiguous text to ask for estimates about vehicle collision without defining the criteria for the scenario. It will be very prone to interpretation, and is really not appropriate in this location.</p> <p>Also to define the full range of structural areas that could be affected by a HEWABI event is much expanded relative to the current practice to consider HEWABI for CFRP fuselage only, CFRP empennage or wing have not to be considered. Therefore, this sentence goes far beyond the original intent of the policy</p>	<p>on the airplane using reasonable scenarios when a HEWABI event may occur (e.g., approximate vehicle size, weight, and speed as a function of structural location.) It should also identify the full range of structural areas that could be affected by a HEWABI event, including the contact zone and adjacent structural reinforcements that react the loads</p>	<p>mandatory after a HEWABI event per § 25.571(a)(3) and provide guidance for acceptable means of compliance.</p> <p>It is important to note that this policy does not restrict the need to consider HEWABI events to only fuselages.</p>

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Commenter: Boeing			
1	<p>Page:1 Para: Summary paragraph.</p> <p>Per Advisory Circular (AC) 20-107B, a</p>	<p>We recommend deleting the existing text and inserting the following text instead:</p> <p><i>“To ensure that any potentially</i></p>	<p>The FAA does not concur and we did not change the policy as suggested. However, we added information to the Policy Section of the document for clarification, as noted in our disposition for</p>

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	<p>category 5 event is beyond that expected to be used in evaluating residual strength or damage tolerance per 25.571. By definition in the AC, a HEWABI event is significant enough that ground crew or individuals round or near the aircraft would be aware that a significant event has occurred therefore a conditional inspection would be appropriate as opposed to requiring a showing of compliance to 25.571(a) and an inspection mandated by the ALS.</p>	<p><i>catastrophic damage resulting from a high-energy wide-area blunt impact (HEWABI) event is detected and repaired, this policy requires that applicants provide appropriate conditional inspection instruction, or other procedures, to be implemented at the occurrence of such impact. HEWABI events are impacts that are spread over a large area of the composite structure and can cause considerable structural damage with minimal surface indications. HEWABI events are well documented occurrences on transport aircraft. Design Approval Holders (DAHs) are required to consider a range of possible damage scenarios when conducting damage tolerance evaluations to show compliance with Title 14, Code of Federal Regulations (14 CFR) §25.571. However, HEWABI events may result in damage that is outside the range of damages considered by DAHs during their damage tolerance evaluation. The potential damage caused by HEWABI events needs to be considered by DAHs when establishing inspections and repair instructions.”</i></p>	<p>Boeing comment 7. Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or accidental damage, will be avoided throughout the operational life of the airplane” (emphasis added). While this policy does not require that Category 5 damage be considered as part of the damage-tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b), applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).</p>

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2	<p>Page:1 Para: Definition of Key Terms, Para 1.</p> <p>This recommended change is intended to provide a reference to the source where the definition of the “Category 5 damage” is, which currently it is only defined in the reference AC.</p>	<p>We recommend revising the highlighted text as follows: <i>“...In composite structure, HEWABI events may cause considerable structural damage with little or no external indication, and are associated with Category 5 damage, as specified in Advisory Circular (AC) 20-170B...”</i></p>	<p>The FAA concurs with this comment and we have revised the policy similarly to the recommendation.</p> <p>We also substituted the word <i>considerable</i> with <i>catastrophic</i> per another commenter’s request.</p>
3	<p>Page: 2 Para: 2.1</p> <p>Our recommended change is intended to provide consistency between what is proposed in this document and the existing definition of Category 3 damage per AC 20-107B.</p>	<p>We recommend revising the text as follows: <i>“2.1 Damage Category 1 through 4 - A range of damages resulting from sources anticipated by the manufacturer and accounted for in the design through the fatigue and damage tolerance evaluation. Damage Category 1 is damage that the aircraft structure can withstand while retaining ultimate loads over the service life of the airplane. Damage Categories. Category 2 and 3 are is classified as damage for which scheduled inspection procedures are implemented. Damage Category 3 is damage that can be reliably detected within a few flights of occurrence by operations or ramp maintenance personnel. Damage Category 4 is damage that is</i></p>	<p>The FAA concurs with this comment and we have revised the paragraph similarly to the recommendation. (Paragraph is now numbered 3.1).</p>

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		<p><i>immediately evident to the pilot, ground crew, or both leading to unscheduled maintenance prior to further flight. Refer to AC 20-107B for a full definition of each category.</i></p>	
4	<p>Page:2 Para: 2.2 [3.2]</p> <p>Section 25.571(a) indicates that this evaluation is to be performed in accordance with §25.571(b), (c), and (e). §25.571(b) specifies “...<i>extent of damage for residual strength evaluation at any time within the operational life of the airplane must be consistent with the initial detectability and subsequent growth under repeated loads...</i>” This has been interpreted and applied as damage that may exist for an extended period of time and grow under operational loading to an extent where residual strength is compromised if proper inspections are not in place to find the damage before it becomes critical. Category 5 damage, as defined by AC 20-107B, is a significant event that has a high probability of being known at the time of the event (ground or flight crew). By definition, it is not a damage state that will go un-inspected.</p>	<p>We recommend revising the text as follows: <i>“2.2 Damage Category 5 - Severe damage created by anomalous ground or flight events that is not covered in the damage tolerance evaluation or structural substantiation procedures required by § 25.571(b) and that requires immediate repair. However, Category 5 damage must be considered as part of the required evaluation under §25.571(a)(3) requires applicants to establish inspections or other procedures to prevent such catastrophic failure from those events. of any accidental damage that may result in catastrophic failure. HEWABI events are an example of events that may result in Category 5 damage to the impacted structure.”</i></p>	<p>The FAA partially agrees with the comment; however, we have not revised the document as suggested. (Paragraph is now numbered 3.2).</p> <p>Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or accidental damage, will be avoided throughout the operational life of the airplane” (emphasis added).</p> <p>It is true that applicants need not consider Category 5 damage as part of the damage tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b); however, applicants are required to consider the potential impact of Category 5 damage per § 25.571(a).</p>

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	This type of damage is not applicable to §25.571(b) or (e) by definition (per AC 20-107B).		
5	<p>Page:2 Para: Current Regulatory and Advisory Material.</p> <p>The intent of our recommended change is to provide consistency with AC 20-107B. Per AC 20-107B the referenced regulations are related, but do not apply to a HEWABI event, which is considered a damage state beyond that required for certification.</p>	<p>We recommend revising the text as follows: <i>The following 14 CFR regulations apply address damage and damage tolerance based inspections:</i></p>	<p>The FAA does not concur and we have not revised the listed regulatory and advisory material.</p> <p>This policy is applicable to § 25.571. Advisory Circular (AC) 20-107B provides an acceptable means of compliance to § 25.571 and other referenced regulations. However, an AC is not a regulation and would not supersede a regulatory requirement. While AC 20-107B does reference Category 5 damage as severe damage created by anomalous ground or flight events which is not covered by design criteria or by the structural substantiation procedures, the AC also states that suitable conditional inspections must be defined.</p> <p>This policy clarifies that the applicant is required to consider possible damage scenarios when evaluating accidental damage that could result in catastrophic failure (§ 25.571(a)) and one of the damage scenarios the applicant should assess is accidental damage caused a HEWABI event.</p>
6	<p>Page:3 Para: Background – 3rd paragraph</p> <p>Per AC 20-107B, the damage due to a Category 5 event exceeds the level of</p>	<p>We recommend revising the text as follows: <i>“...The damages that result from a HEWABI event may exceed those resulting from the scenarios associated with Category 1 through Category 4</i></p>	<p>The FAA does not concur with the recommended change and we have not revised the text as suggested.</p> <p>Section 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion,</p>

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	<p>damage necessary for compliance with §25.571. However, it is appropriate to provide conditional inspections in the AMM Chapter 5 similar to the conditional inspections provided for hard landings.</p>	<p><i>damage yet may be less visible; so to comply with § 25.571(a) therefore, other precautionary steps must be taken by the applicant to avoid catastrophic failures</i> <i>Such events are typically obvious to personnel involved in the event, either through the sound of creating structural damage or through personally experiencing the forces involved.”</i></p>	<p>manufacturing defects, or accidental damage, will be avoided throughout the operational life of the airplane” (emphasis added).</p> <p>It is true that applicants need not consider Category 5 damage as part of the damage tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b); however, applicants are required to consider the potential impact of Category 5 damage per § 25.571(a). Therefore, we did not delete the reference to § 25.571(a) in the reference paragraph.</p>
7	<p>Page:4 Para: Policy, 1st paragraph</p> <p>Inclusion of a conditional inspection in the ALS for HEWABI events is inconsistent with HEWABI threats being beyond that needed to show compliance with §25.571(a), per the AC 20-107B definition of Category 5 damage, and HEWABI specifically. Per Advisory Circular 20-107B, the damage due to a Category 5 event exceeds the level of damage necessary for compliance with §25.571. However, it is appropriate to provide</p>	<p>We recommend revising the text as follows: “... <i>Section 25.571(a)(3) requires applicants to establish inspections or other procedures to prevent such catastrophic failure from those events, and include them in the Airworthiness Limitations Section (ALS) of the Instructions for Continued Airworthiness required by § 25.1529 and Appendix H to part 25. While the ALS has historically focused on damage tolerance inspections to address fatigue, this policy § 25.571(a)(3) also requires inspections or other procedures to address accidental</i></p>	<p>The FAA partially agrees with the comment and we have revised the policy; however, we have not revised the policy exactly as the commenter suggested</p> <p>Per AC 20-107B, Category 5 damage is not addressed in the damage tolerance evaluation required by § 25.571(b) to establish inspection intervals for airplane maintenance as required by § 25.571(a)(3). However, we are clarifying that applicants are required to consider the potential effects of Category 5 accidental damage, develop conditional inspections and include them in the Airworthiness Limitations Section of the instructions for continued airworthiness per § 25.571(a)(3).</p>

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	conditional inspections in the AMM Chapter 5 similar to the conditional inspections provided for hard landings.	<i>damage from HEWABI events. ...”</i>	<p>We added the following italicized information to the end of the first paragraph of the section titled “POLICY” to further clarify the regulatory requirements:</p> <p><i>The applicant does not need to consider Category 5 damage as part of the damage-tolerance evaluation used to establish scheduled inspections; however, the applicant should consider the potential effect of Category 5 accidental damage, develop conditional inspections, and include them in the ALS of the ICA per § 25.571(a)(3).</i></p>
8	<p>Page: 4 Para: Policy, Para 2 and 3</p> <p>Inclusion of a conditional inspection in the ALS for HEWABI events is inconsistent with HEWABI threats, being beyond that needed to show compliance with §25.571(a), per the AC 20-107B definition of Category 5 damage, and HEWABI specifically. We recommend replacing the two paragraphs with a more direct instruction to DAHs.</p>	<p>We recommend revising the text as follows: <i>“2 DAHs must create appropriate maintenance actions, such as conditional inspections and should develop operator training, to ensure HEWABI events are properly evaluated and dispositional prior to the next flight.”</i> <i>Establishing a limitation in the ALS which sets the requirement for conditional inspections when a HEWABI event occurs, and indicating how the operator can identify HEWABI events so that the airplane is removed from service until the appropriate necessary maintenance is completed.</i> 3</p>	<p>The FAA does not concur and we did not revise the document as suggested.</p> <p>The reference to Category 5 damage is in paragraph 8a, titled “Damage Tolerance Evaluation” of Advisory Circular (AC) 20-107B. This section of the AC provides an acceptable means of compliance to § 25.571(b), also titled <i>Damage-tolerance evaluation</i> (DTE). This policy, on the other hand, provides clarification of the evaluation conditions which may cause catastrophic failure under § 25.571(a), which may not be the same as the damage tolerance evaluation required in § 25.571(b). In Appendix H25.4, <i>Airworthiness Limitations</i> section, under section (a)(1), it states, “The Instructions for Continued Airworthiness must contain a section titled Airworthiness</p>

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		<p>Providing the appropriate detailed maintenance instructions in the ICA, such as inspections or other actions, to ensure HEWABI events are properly evaluated and dispositioned prior to the next in-service flight. Refer to Order 8110.54A for guidance on ICA content."</p>	<p>Limitations [ALS] that is segregated and clearly distinguishable from the rest of the document. This section must set forth ...each mandatory modification time, replacement time, structural inspection interval, and related structural inspection procedure approved under § 25.571." This policy clarifies that conditional inspections required after a HEWABI event is covered under the evaluation required by § 25.571(a) and must be included in the ALS per Appendix H25.4. As stated in the AC, Category 5 events (such as HEWABI) need not be addressed for the DTE required by § 25.571(b), but still needs to be addressed for the evaluation required by § 25.571(a).</p>
9	<p>Page: 5 Para: 3, Conclusion</p> <p>Our intent with these recommended changes is to provide consistency with other recommended changes in several locations within the proposed document (i.e., Summary, Definition of Key Terms, and Background). As mentioned in our other recommended changes, the inclusion of a conditional inspection in the ALS for HEWABI events is inconsistent with HEWABI threats being beyond that needed to show compliance with §25.571(a), per the AC 20-107B definition of Category 5 damage, and HEWABI</p>	<p>We recommend revising the text as follows: <i>"...For airplanes with composite structure, the accidental damage caused by a HEWABI event, which is beyond the scope of the damage tolerance evaluation, but may not be readily apparent by visual inspections only. Therefore, to satisfy this policy To comply with §§ 25.571, 25.1529 and Appendix H to part 25, applicants need to provide the operators with the appropriate conditional inspections, of other procedures and instructions."</i></p>	<p>The FAA does not concur and we have not revised the document as suggested.</p> <p>Please see our comment for #8 above. This policy clarifies that conditional inspections after a HEWABI event are required per § 25.571(a) and must be included in the ALS per Appendix H25.4 to part 25.</p>

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	specifically.		
10	<p>Page: 7 Para: Appendix B, First Paragraph, Background Information: Differences and Similarities for Blunt Impact Versus More Common Impacts Clarify that this type of conditional inspection needs to be appropriate for different types of structure. Alternatively, a generic inspection should be developed to address the probable damage locations.</p>	<p>We recommend revising the text as follows: <i>"... For this policy, HEWABI events are those that have sufficient energy to cause Category 5 damage, but which may not be readily apparent from a visual inspection. The applicant should provide general procedures for operators to follow when a possible Category 5 damage event occurs to ensure that the structure is properly inspected and, if needed, repaired prior to further service. Care should be taken to distinguish Category 5 events from the more typical events identified in damage Categories 1, 2, 3, and 4."</i></p>	<p>The FAA concurs with this comment and we have revised the policy as suggested, with minor editorial changes.</p>
11	<p>Page:7 Para: Appendix B, Third Paragraph, Summary of AC 20-107B Guidance in Regard to Category 5 Damage</p> <p>Per the definition given in Advisory Circular 20-107B, Category 5 damage exceeds the level of damage necessary for compliance with §25.571(a). We recommend removing the statement, as</p>	<p>We recommend revising the text as follows: <i>"... Because of the unpredictable nature of events that cause Category 5 events, applicants are not expected to include Category 5 damage in their damage tolerance evaluation per § 25.571(b). However, they are expected to include Category 5 damage when considering accidental damage in compliance with § 25.571(a)..."</i></p>	<p>The FAA does not concur and we have not revised the document as suggested.</p> <p>Please see our response to #8 above. This policy clarifies that applicants are expected to include Category 5 damage when considering accidental damage in compliance with § 25.571(a); therefore, we have not removed this reference from Appendix B.</p>

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	indicated, for consistency purposes.		
12	<p>Page:8 Para: Composite Structures Response to HEWABI Events, 1st paragraph</p> <p>The text as written is not completely accurate for all areas or designs. We recommend revising the wording to be consistent with the likelihood or probability of event, and to accommodate the variety of structure that exists in a transport aircraft.</p>	<p>We recommend revising the text as follows: <i>“...For example, the failure of frames and shear ties allows may allow very large skin deflections to occur without obvious exterior visual indications of failures in the skin panels during a HEWABI event...”</i></p>	<p>The FAA concurs with this comment and we have revised the policy as suggested.</p>
13	<p>Page:8 Para: Composite Structures Response to HEWABI Events, last sentence of 1st paragraph</p> <p>The intent of our recommendation is to eliminate confusion. One could be confused by this statement, assuming the “analyses” here refers to damage tolerance analyses. But per the previous page, it is not: <i>“Because of the unpredictable nature of events that cause Category 5 events, applicants are not expected to include Category 5 damage in their damage tolerance evaluation per § 25.571(b)”.</i></p>	<p>We recommend removing the last sentence of this paragraph. <i>“...As the structural configuration and design details change over the exterior surface, differences are likely for HEWABI events. For example, exterior indications of a HEWABI event near a fuselage cargo door will differ from that occurring in other locations. As for damage tolerant structure, critical HEWABI data should include balanced structural designs and analyses supported by tests.”</i></p>	<p>The FAA concurs and we have deleted the referenced sentence.</p>

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Commenter: Boeing			
14	<p>Page: 9 Para: Recommendations on How the DAH and Operators Should Jointly Address HEWABI Events, 1st paragraph</p> <p>A generic inspection should be developed to address the probable damage locations.</p>	<p>We recommend revising the text as follows: <i>“As defined by the classification system offered by AC 20-107B, Category 5 damage is beyond the range of damage covered in damage Categories 1 through 4. As a result, operators should have appropriate safety management practices in place to ensure proper inspections and repair prior to further flight when an event that causes Category 5 damage occurs...”</i></p>	<p>The FAA concurs and we have revised the document to include the intent of the comment.</p> <p>The sentence was changed to read: <i>Therefore, when an event occurs that could potentially cause Category 5 damage, appropriate safety management practices should be in place to ensure that the event is reported and that inspections and repairs are conducted prior to further flight.</i></p>
15	<p>Page: 9 Para: Recommendations On How the DAH and Operators Should Jointly Address HEWABI Events, 1st paragraph.</p> <p>Clarification is needed to indicate that this type of conditional inspection needs to be appropriate for different types of structure. Alternatively, a generic inspection should be developed to address the probable damage locations. Inclusion of a conditional inspection in the ALS for HEWABI events is inconsistent with HEWABI threats being beyond that needed to show compliance with §25.571(a), per the AC 20-107B definition of Category 5 damage, and HEWABI</p>	<p>We recommend revising the text as follows: <i>“...In order for operators to develop their safety management practices, the DAH should provide the appropriate general conditional inspections or other actions an operator should use to address the occurrence of a HEWABI event in their provided maintenance manual. , with appropriate references in the ALS...”</i></p>	<p>The FAA does not concur and we have not removed the reference to the ALS as suggested. However, we did rewrite much of Appendix C.</p> <p>As stated previously, § 25.571(a) states: “An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or accidental damage, will be avoided throughout the operational life of the airplane” (emphasis added). It is true that applicants need not consider Category 5 damage as part of the damage tolerance evaluation used to establish scheduled inspections or other procedures as required by § 25.571(b); however, applicants are required to consider the potential impact of Category 5 damage per</p>

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Prepared by Mark Freisthler, ANM-115

No.	Comment	Requested Change	Disposition
	Commenter: Boeing		
	specifically.		§ 25.571(a).
16	<p>Page: 9 Para: Recommendations On How the DAH and Operators Should Jointly Address HEWABI Events, 2nd paragraph. Analyses may be more appropriate than available test results if the test does not well represent the range of possible HEWABI events/damage.</p>	<p>We recommend revising the text as follows: <i>“The objective of this policy is to clearly state that the AMM or an equivalent document provided by the applicant should document what conditional inspections or other procedures an operator should conduct for HEWABI events. Data collected during HEWABI tests and and/or analyses can be used to derive go versus no-go considerations for subsequent flight...”</i></p>	<p>The FAA concurs with the commenter’s statement. However, we have revised the statement to read: <i>The DAH may provide the operator with data collected during HEWABI tests or analyses to derive “go” versus “no-go” considerations for subsequent flight.</i> (This sentence is now located in the third paragraph of Appendix C).</p>
17	<p>Page:10, Appendix C Para: First paragraph</p> <p>Engineering data collected by DAHs will not be shared directly with external organizations for concern of being improperly used.</p>	<p>We recommend revising the text as follows: <i>“Data collected in HEWABI engineering studies should be documented and shared with used in supporting internal and external maintenance support organizations. Discussions of HEWABI phenomena and the supporting engineering efforts performed to establish safety management procedures appear in CMH-17, Volume 3, Chapters 12 and 14, Revision G.”</i></p>	<p>The FAA concurs and we have revised the document to capture the intent of the comment. Appendix C was changed to read, <i>The DAH should work with operators and maintenance providers to establish the necessary training. The training should be based on data collected by the DAH in establishing conditional inspections for a HEWABI event. The appropriate training will differ significantly as a function of the corresponding roles in supporting safety. For example, operations, line maintenance, and engineering personnel all have different knowledge needs.</i> Also, later in Appendix C we state, <i>The DAH should document and share data collected in</i></p>

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Commenter: Boeing			
			<i>HEWABI engineering studies with maintenance support organizations internal and external to the DAH. Discussions of HEWABI phenomena and the supporting engineering efforts performed to establish safety management procedures appear in CMH-17, Volume 3, Chapters 12 and 14, Revision G.</i>
18	<p>Page:10, Appendix C Para: Second paragraph</p> <p>In accordance with the proposed policy memo’s Appendix A definition of key terms, the inclusion of reference statements in the SRM is a best practice (and may be approached differently by different OEMs, given that an SRM is not a type design requirement), not a prescribed means of compliance</p>	<p>We recommend revising the text as follows: <i>“The AMM, or an equivalent document, outlines conditional inspections for a HEWABI event. The allowable damage limits (ADL) in the SRM, derived from static strength, fatigue, and damage tolerance data, may not be accurate for HEWABI events because the events causing Category 5 damages are beyond those that are addressed by structural design and substantiation. Notes should be added to the SRM to ensure ADL are not applied to a HEWABI event. It is recommended that notes be added to the SRM to ensure ADL are not applied to a HEWABI event.”</i></p>	<p>The FAA concurs with the requested revision and we have revised the document to read: <i>The FAA recommends adding notes to the SRM to ensure ADL are not applied to a HEWABI event.</i></p>
19	<p>Page:10, Appendix C Para: Third paragraph</p> <p>In accordance with the proposed policy memo’s Appendix A definition of key</p>	<p><i>“The applicant should perform the engineering studies to characterize potential HEWABI events. The resulting information</i></p>	<p>The FAA partially concurs with this comment. We heavily revised Appendix C but did not totally remove the requested information from the document.</p>

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Commenter: Boeing			
	<p>terms, use of the term “should” makes the paragraph overly prescriptive as a means of compliance. Reference to HEWABI engineering studies is previously made in Appendices B and C, and, hence, this proposed paragraph is redundant.</p>	<p><i>should be used to develop a checklist to be used by operators for the reporting of HEWABI events. This may include any exterior visual clues of serious internal Category 5 damage. It should also provide conservative estimates of the vehicle collisions needed to cause Category 5 damage in specific locations on the airplane using reasonable scenarios when a HEWABI event may occur (e.g., approximate vehicle size, weight, and speed as a function of structural location.) It should also identify the full range of structural areas that could be affected by a HEWABI event, including the contact zone and adjacent structural reinforcements that react the loads. This information is needed to define the specific conditional inspections documented in the AMM.”</i></p>	<p>The title of Appendix C is <u>Recommendations on How a DAH Can Interface with Operators to Jointly Address HEWABI Events</u> (emphasis added) and is intended as guidance only. However, we did revise the appendix to sound less prescriptive per the commenter’s suggestion.</p>

No.	Comment	Requested Change	Disposition
Commenter: Dassault			
1	It should be precised that HEWABI		The FAA does not concur.

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	Commenter: Dassault		
	<p>concern ground collisions with service vehicle only. Fuselages are the only aircraft structure prone to such impacts.</p> <p>No other damage scenario is concerned by HEWABI.</p>		<p>This policy is applicable to all principal structural element (PSE) structures (covered by §25.571) that may be subjected to a HEWABI event. We modified the Policy section of the document as follows:</p> <p><i>Section 25.571(a) requires that applicants conduct an evaluation of the strength, detail design, and fabrication of the structure to show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or accidental damage will be avoided throughout the operational life of the airplane. Section 25.571(a)(3) requires applicants to establish inspections or other procedures to prevent such catastrophic failure from those events, and include them in the Airworthiness Limitations section (ALS) of the Instructions for Continued Airworthiness required by § 25.1529 and appendix H to part 25. While the ALS has historically focused on scheduled damage tolerance inspections to address fatigue, § 25.571(a)(3) also requires inspections or other procedures to address accidental damage from HEWABI events. Authorities and industry cannot easily predict HEWABI events that may cause Category 5 damage in PSEs and therefore cannot readily establish scheduled inspections for such damage. Applicants should address these events by other safety risk mitigation procedures such as reporting means and required conditional</i></p>

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No.	Comment	Requested Change	Disposition
Commenter: Dassault			
			<p><i>inspections and immediate repair. Because the damage caused during a HEWABI event could exceed the capability of the airplane to sustain the loads required by § 25.571(b), inspections of the damage prior to continued flight are necessary to prevent catastrophic failure and meet the requirements of § 25.571(a).</i></p> <p>We also added the definition for PSEs in the Definition of Key Terms section of the document.</p>

No.	Comment	Requested Change	Disposition
Commenter: Rohr Inc., dba Goodrich Aerostructures			
1	<p>On page 4, we propose the following change:</p> <p>(IS) For composite structure, the applicant should consider HEWABI-related events by:</p>	<p>(PROPOSED CHANGE) For composite structure that is classified as primary (PSE) structure, the applicant should consider HEWABI-related events by:</p> <p><u>RATIONALE:</u></p> <p>The HEWABI issue primarily results from concerns about impacts to composite fuselage structure, which are more susceptible to ground vehicle collisions resulting in non-visible damage. The policy memo should be clear that the HEWABI issue and compliance methods do not apply to</p>	<p>The FAA partially concurs with this comment. We revised the document to be clearer about PSEs. We also added the definition for PSEs in the Definition of Key Terms section of the document. However, this policy does not require any airplane structure to be redesigned; only that if a HEWABI event ever occurs, appropriate conditional inspections should be available to the operators.</p> <p>Reference our response to Dassault comment above for the revised language in the policy.</p>

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Commenter: Rohr Inc., dba Goodrich Aerostructures			
		composite structures such as nacelles, fairings, radomes and landing gear doors for which there are many years of service experience without any HEWABI events leading to unsafe conditions. A lack of clarity in the policy memo as to which “composite structures” are applicable could lead to excessive design requirements being imposed on these structural components resulting in increased cost and weight impacts to the aircraft for no safety benefit.	

No.	Comment	Requested Change	Disposition
Commenter: Bombardier			
1	Ref: Page 1, “Definition of Key Terms” <i>“In composite structure, HEWABI events may cause considerable structural damage with little or no external indication.....”</i>	The AC 20-107B, Category 5 definition should be referenced, as it is well understood and widely used. (i.e. “Refer to AC 20-107B for full definition of Category 5 damage”)	The FAA concurs and we have revised the document as follows: <i>In composite structure, HEWABI events may cause catastrophic structural damage with little or no external indication, and can cause Category 5 damage as specified in Advisory Circular (AC) 20-107B.</i>
2	Ref: Page 2, Section 2.1 [3.1]	Linking directly scheduled inspections with Category 3 damages (detectable	The FAA concurs with this comment and we have revised the policy per another commenter’s

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Commenter: Bombardier			
	<p><i>“Categories 2 and 3 are classified as damage for which scheduled inspection procedures are implemented.”</i></p>	<p>within few flights) may be a little confusing, given the definition of both in AC 20-107B.</p> <p>It is suggested to separate Categories 2 and 3 if the emphasis is placed on “scheduled inspection procedures”.</p>	<p>suggestion. (The referenced section is now 3.1). The wording has been changed to the following:</p> <p><i>3.1 Damage Category 1 through 4 - A range of damages resulting from sources anticipated by the manufacturer and accounted for in the design through the fatigue and damage tolerance evaluation. Damage Category 1 is damage that the aircraft structure can withstand while retaining ultimate loads over the service life of the airplane. Damage Category 2 is damage for which scheduled inspection procedures are implemented. Damage Category 3 is damage that can be reliably detected by operations or ramp maintenance personnel within a few flights of occurrence (emphasis added to depict edit to document). Damage Category 4 is damage that is immediately evident to the pilot, ground crew, or both leading to unscheduled maintenance prior to further flight. Refer to AC 20-107B for a full definition of each category.</i></p>
3	<p>Ref: Page 2, Section 2.2</p> <p><i>“However, Category 5 damage must be considered as part of the required evaluation under § 25.571(a) of any accidental damage that may result in catastrophic failure.”</i></p>	<p>The statement can be interpreted that applicant is required to consider Category 5 damage under 25.571(a) and therefore design and size structure to preclude catastrophic failure, which would not be in line with the definition</p>	<p>The FAA does not concur and we did not make the suggested change to the document. However, we added the following italicized information to the end of the first paragraph of the section titled “POLICY” to further clarify the regulatory requirements:</p>

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No.	Comment	Requested Change	Disposition
Commenter: Bombardier			
		<p>of Category 5 damage (Ref. AC 20-107B).</p> <p>It is understood that the objective of the policy is to request generic considerations of Category 5 (HEWABI) event for the given structure, on the basis of likelihood of occurrence, resulting into set of instructions for operators that all together form the basis for avoidance of catastrophic failures.</p> <p>Bombardier recommends that the statement is changed to avoid reference to 25.571(a) while discussing Category 5 damage (HEWABI).</p> <p>Bombardier is at the opinion that the HEWABI events should not strictly be considered under compliance with 25.571(a) during certification process resulting into generation of specific compliance data.</p>	<p><i>The applicant does not need to consider Category 5 damage as part of the damage-tolerance evaluation used to establish scheduled inspections; however, the applicant should consider the potential effect of Category 5 accidental damage, develop conditional inspections, and include them in the ALS of the ICA per § 25.571(a)(3).</i></p> <p>Section 25.1529 only requires the applicant to issue instructions for continued airworthiness and does not directly address the need to conduct an evaluation of accidental damage. Appendix H25.4, Airworthiness Limitation section (ALS), does require that each mandatory structural inspection approved under § 25.571 be included in the ALS. This policy clarifies that mandatory conditional inspections also need to be included in the ALS.</p> <p>An advisory circular (AC) is not a substitute for a regulation. The purpose of an AC is to provide guidance materials to the aviation community. The guidance can be methods, procedures, or practices acceptable to the FAA Administrator for complying with regulations.</p>
4	<p>Ref: Page 4, Section “Policy” (2)</p> <p><i>“Establishing a limitation in the ALS which sets the requirement for conditional inspections when a HEWABI event occurs,</i></p>	<p>As the instructions do not represent actual limitations that can also be associated with any mandated scheduled activities, Bombardier does not consider it practical to address</p>	<p>The FAA does not concur with the comment and we have not incorporated this recommendation in the policy statement.</p> <p><i>Appendix H25.4, Airworthiness Limitation section</i></p>

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Commenter: Bombardier			
	<i>and indicating how the operator can identify HEWABI events so that the airplane is removed from service until the appropriate necessary maintenance is completed.”</i>	HEWABI related instructions into ALS. Bombardier recommends that the set of generic instructions is incorporated into AMM (currently called AMP – “Aircraft Maintenance Publication”) instead of ALS. In addition, the reference to the instructions (AMM) can also be built into the SRM.	(ALS), does require that each mandatory structural inspection approved under § 25.571 be included in the ALS. This policy clarifies that mandatory conditional inspections also need to be included. It is acceptable to include the requirement to conduct a conditional inspection in the ALS which references the dedicated chapter in the aircraft maintenance manual (AMM).

No.	Comment	Requested Change	Disposition
Commenter: GE			
1	Per 14 CFR Part 25.571, engine nacelles are generally considered secondary structures, not primary structure, so this Policy Statement should not apply to them. Nacelles are considered LRU’s and should be sent to a qualified MRO for evaluation if damage is suspected. However, GE thinks that the Policy Statement should make it clear that both the operator and OEM share the responsibility in relation to a HEWABI event. The operator has an obligation to consider and perform more than visual inspections and should engage with the OEM if inspection guidance is needed. As the nature of each HEWABI event will vary, guidance provided in the	Add a statement that guidance provided in an AMM or other document cannot cover every HEWABI event and that the operator should provide details of specific events to the OEM and request guidance.	<p>The FAA partially concurs with this comment. We have revised the document to clarify that the policy is applicable to PSEs.</p> <p>This policy is applicable to any structure that may be subjected to a HEWABI event. While the term “principle structural elements” (PSE) is defined in Advisory Circular 25.571-1D, <i>Damage Tolerance and Fatigue Evaluation of Structure</i>, there is not a definition for “secondary” structure where different regulations would apply. (Note: This policy is directed to part 25 applicants only, not operators.)</p> <p>The FAA concurs that the operator has an obligation to perform necessary inspections and that the ICA can only give general guidance.</p>

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No.	Comment	Requested Change	Disposition
Commenter: GE			
	AMM or other documents can only be general and the operator should contact the OEM for more specific guidance based upon the details of the event.		

No.	Comment	Requested Change	Disposition
Commenter: John Lucien, Structural Integrity Group			
1	Based on the definition within this policy, “HEWABI events are those that have sufficient energy to cause Category 5 damage, but which may not be readily apparent from a visual inspection.”	I propose the addition of “blown tire treads” as a referenced HEWABI event, unless it can be shown that mark off occurs in all cases or the mass/energy level of the blown tread is within the ADL impact levels.	The FAA does not fully concur with the requested change and we did not add a reference to blown tire treads in the policy. The main concern of this policy is to provide guidance for compliance to the regulations for HEWABI events. We agree the airplane manufacturer should provide operators with conditional inspections for tire burst events, but a tire burst does not fit the category of “wide area blunt impact” and does not fall under this policy.

No.	Comment	Requested Change	Disposition
Commenter: Tom Knott			
1	I am in support of the draft Policy Statement as written. The requirements have been in the regulations forever, and AC 20-107B explained it pretty well. The	None	None

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No.	Comment	Requested Change	Disposition
Commenter: Tom Knott			
	only new thing here is the acronym (HEWABI) - "it finally has a name". As an introduction/explanation - I'm a structural DER so I'll get some use out of this. Thanks for creating it.		