

DISPOSITION OF FAA COMMENTS

AC 25.307-X, Proof of Structure
Prepared by Todd Martin, ANM-115

No.	Comment	Requested Change	Disposition
Commenter: Ivan Li, ANM-100B			
1	§ 25.307 states that “structural analysis may be used only if the structures conform to that for which experience has shown this method to be reliable.” Thus, classical analysis have been accepted as a method of compliance for this section. Therefore, section 9 of this AC should provide some reference to classical analysis.	Provide reference.	<p>Classical analysis would fall into the category of “Analysis supported by previous test evidence” as specified in section 9.</p> <p>Also, the commenter’s point is captured in section 6d, which states: “There are a number of standard engineering methods and formulas that are known to produce acceptable, often conservative results especially for structures where load paths are well defined.”</p> <p>No change.</p>

No.	Comment	Requested Change	Disposition
Commenter: T.N. Baktha, ACE-118W			
1	7b(2)(d) Materials	“Material properties” may be appropriate.	Agreed. Change will be made.
2	8c. The consequence of failure of interior items of mass	The consequence of failure “to retain” interior items of mass.	Agreed. Change will be made.
3	10a(3) Comparison of analytical methods. It is not clear what is intended here. Is it “Comparison of test results with analytical Data”?		Yes, the intent is “Comparison of test results with analytical predictions.” This change will be made.

DISPOSITION OF FAA COMMENTS

AC 25.307-X, Proof of Structure
Prepared by Todd Martin, ANM-115

No.	Comment	Requested Change	Disposition
Commenter: Gregory Noles, ACE-117A			
1	Will AC 25-1 be updated to reference this new guidance material?	A complementary update to AC 25-1.	AC 25-1 does not exist. We believe the commenter is referring to AC 25-21, Certification of Transport Airplane Structure. No change is planned to update that AC at this time; however, we recognize the need to update that AC.

No.	Comment	Requested Change	Disposition
Commenter: Jim Kabbara, AIR-120			
1	<p>Last sentence in paragraph 6c, page 3 of the AC: “As compliance by test only is impractical in most cases, a large portion of the substantiating data will be based on analysis.”</p> <p>Some analyses if not supported or previously substantiated by some tests may not be reliable and could produce unsafe conditions.</p>	Change sentence to read: “As compliance by test only is impractical in most cases, a large portion of the substantiating data will be based on reliable analysis.”	<p>The intent of the sentence is just to point out that analysis will be used in lieu of testing for the vast majority of substantiation to § 25.307. We say here that “analysis will be used” and elsewhere we say that this analysis must therefore be reliable.</p> <p>No change.</p>

DISPOSITION OF FAA COMMENTS

AC 25.307-X, Proof of Structure
Prepared by Todd Martin, ANM-115

No.	Comment	Requested Change	Disposition
Commenter: Robert Grant, ASW-112			
1	Paragraph 10b: The emphasis on this paragraph is investigating a test failure below ultimate load. This paragraph should have greater emphasis on correlating analytical predictions to test results, which would include the case where a failure occurred below ultimate load.	Rewrite paragraph 10b to put more emphasis on correlating the analytical model to the test results such as: Testing is used to validate analytical methods except when showing compliance by test only. If the analytical predictions do not correlate with the test results, the reasons should be investigated and appropriate changes made to correlate the analytical model. This should be accomplished whether or not a test article fails below ultimate load. This investigation should include a review of the test specimen and loads, analytical loads, and the structural analysis. This may lead to adjustment in analysis/modeling techniques and/or part redesign and may result in the need for additional testing. If a failure occurred below ultimate load, the need for additional testing to ensure ultimate load capability depends on the degree to which the failure is understood and the analysis can be validated by the test.	Partially agree. The wording will be revised as follows: Testing is used to validate analytical methods except when showing compliance by test only. If the test results do not correlate with the analysis, the reasons should be investigated and appropriate action taken. This should be accomplished whether or not a test article fails below ultimate load. This investigation should include a review of the test specimen and loads, analytical loads, and the structural analysis. This may lead to adjustment in analysis/modeling techniques and/or part redesign and may result in the need for additional testing. Should a failure occur below ultimate load, an investigation by the applicant should be conducted to reveal the cause of this failure. The need for additional testing to ensure ultimate load capability depends on the degree to which the failure is understood and the analysis can be validated by the test.

DISPOSITION OF FAA COMMENTS

AC 25.307-X, Proof of Structure
Prepared by Todd Martin, ANM-115

No.	Comment	Requested Change	Disposition
Commenter: Robert Grant, ASW-112			
2	General	Guidance on testing should be provided in the AC such as that used in AC 29.307: Whenever tests are used or required, a test proposal or plan must be approved prior to the tests. The test article must have received conformity inspections and must have been accepted by the FAA/AUTHORITY for the test. Test fixtures and instrumentation must also be acceptable to the FAA/AUTHORITY (using DERs as appropriate) prior to the start of the test. The quality control office of the applicant or other qualified personnel may be authorized to conduct inspections of the test fixtures and instrumentation rather than the FAA/AUTHORITY or DER performing this task. The test proposal may be used to define and to authorize the means to accomplish inspection of the test fixtures and instrumentation.	We believe the suggested guidance is generic for all certification testing and is not necessary to include within this particular AC.

DISPOSITION OF FAA COMMENTS

AC 25.307-X, Proof of Structure
Prepared by Todd Martin, ANM-115

No.	Comment	Requested Change	Disposition
Commenter: JC Lin, ASW-170			
1	<p>Paragraph 7b(2)(a) External loads (bending moment, shear, torque, etcetera) and Paragraph 7b(2)(b) Internal loads (strains, stresses, etcetera).</p> <p>I do not believe the words in the parentheses are the correct definition for external loads or for internal loads. For instance, for an entire aircraft, the external loads are flight loads, aerodynamic forces, inertial forces, engine torque, etc. The internal loads are loads going through internal load paths, such as wing spar, airframes, floor beams, etc.</p>	<p>I do not have a good suggestion for the replacement definition for external loads or for internal loads. I suggest to delete the parentheses for both terms.</p>	<p>The parenthetical expressions used to clarify “external loads” and “internal loads” are in line with traditional usage. It is correct that “external loads” does include aerodynamic and inertia forces, etc. However, in this context, we are interested in how those loads are distributed on the structure in terms of bending moment, shear and torque. Internal loads are then the next lower level, where the external loads are distributed to individual elements of the structure, and are quantified by stresses and strains.</p> <p>No change.</p>

No.	Comment	Requested Change	Disposition
Commenter: George Duckett, ANE-170			
1	<p>§ 25.307(a): In verifying structural behavior up to load levels specified in § 25.305, how can you define “sufficient” without using analysis? In other words, if analysis is not reliable, tests must go to ultimate because unreliable analysis would have to be used to define “sufficient.”</p>	<p>Leave § 25.307(a) as is, or explain how “sufficient” could be defined without analysis.</p>	<p>The AC provides guidance on the need for and the extent of testing necessary to determine what is “sufficient.” This determination relies less on analysis of the structure than on the classification of the structure as “new,” “similar” or “derivative.” The AC lists the following items to consider in making this classification:</p> <p>The accuracy/conservatism of the analytical methods and comparison of the structure under</p>

DISPOSITION OF FAA COMMENTS

AC 25.307-X, Proof of Structure
Prepared by Todd Martin, ANM-115

No.	Comment	Requested Change	Disposition
Commenter: George Duckett, ANE-170			
			<p>investigation with previously tested structure. Considerations include:</p> <ul style="list-style-type: none"> • External loads (bending moment, shear, torque, etc.). • Internal loads (strains, stresses, etc.). • Structural design concepts such as details, geometry, structural arrangements, load paths. • Material properties. • Test experience (load levels achieved, lessons learned). • Deflections. • Deformations. • Extent of extrapolation from test stress levels. <p>No change.</p>

No.	Comment	Requested Change	Disposition
Commenter: Angeline Garrett, AIR-500			
1	Global change. Incorrect formatting. Only the first two levels of a paragraph should be bold.	Remove the bold from all subsection numbers and letters beyond the second level of the paragraph.	We agree and have revised the AC accordingly.
2	Under Subject Area, Page 1. Missing black line. Non-compliance format of Order 1320.46C.	Place a black above the Purpose title.	We agree and have revised the AC accordingly.

DISPOSITION OF FAA COMMENTS

AC 25.307-X, Proof of Structure
Prepared by Todd Martin, ANM-115

No.	Comment	Requested Change	Disposition
Commenter: Angeline Garrett, AIR-500			
3	Paragraph 5h, Page 3. Improper capitalization.	Remove the capitalization form the terms “test evidence” in the paragraph title.	We agree and have revised the AC accordingly.
4	Paragraph 7a(1) – (3), Page 4. Missing period. Inconsistent with the rest of the document.	Place a period after the term “structure” in each paragraph.	We agree and have revised the AC accordingly.
5	Paragraph 7b(2)(a) & (b), Page 4.	Delete the term “etcetera.” Replace with the abbreviation “etc.”	We agree and have revised the AC accordingly.
6	Paragraph 9c(1) & 9d(2), last sentence, Pages 5 & 6.	Delete the term “etcetera.” Replace with the abbreviation “etc.”	We agree and have revised the AC accordingly.
7	Paragraph 9c(1), Page 5. Incorrect formatting.	Remove the bar line indicating where a change took place.	We agree and have revised the AC accordingly.
8	Page 7. Missing signature block.	Place a signature block five spaces after the last paragraph of the document.	We disagree. The signature block should only appear in the final AC. Instead, the word “END” is used in its place, so the reader understands that the last page of the AC guidance has been reached.
9	Page 7. Incorrect formatting.	Delete the term “END” at the bottom of the page.	We disagree. The word “END” is used to notify the reader that the last page of the AC guidance has been reached.