Document: ACI CODE-562 Assessment, Repair, and Rehabilitation of Existing Concrete Structures—Code Requirements and Commentary

1.	Commenter	Page #	Line #	Comment	Committee Response
2.	Gwenyth R. Searer. S.E.	?	?	Where is Chapter 3? It used to contain references to other standards, but it is missing from this version. Chapter 3 contains (contained?) references to both the standard number and the year for ACI standards but failed to include references to the publication date for other standards. I pointed this out during the last public comment. Unless you define which version of ASCE 7 or which version of ASCE 41 you are referencing in this code, you leave the user the ability to just pick any edition of the standard. Is that really your intent?	***Persuasive Editorial***. Document will be reviewed to ensure consistent standards are referenced. This was done in all prior versions.
3.	Gwenyth R. Searer. S.E.	ALL	ALL	Why is the Appendix A from the 2019 ACI 562 not shown as being stricken? Why does the stricken text on page 3, lines 27 to 42 not appear to match the text in the 2019 ACI 562? I am sorry if these are dumb questions, but I am lost. I am not seeing the original text from the 2019 ACI 562 being shown as stricken in many locations. For example, where is the text that was in 1.2.4.2 of ACI 562-19? In 2019, it used to read: "1.2.4.2 Assessment and design-basis criteria and the requirements for applying these criteria are provided in Chapter 4 and Appendix A. Chapter 4 applies if a jurisdiction has adopted the International Existing Building Code (IEBC) as the existing building code. Appendix A applies if a jurisdiction has not adopted the IEBC or if a jurisdiction has adopted this code. In fact, it seems like this redline version that is published for public comment is some version of ACI 562 after the 2019 version. Even in the struck-out provisions, there are no references to Appendix A, which my version of ACI 562 has.	***Persuasive Editorial*** - Appendix A will need to be stricken as well as removing the listing in table of contents as this material has been relocated to Chapter 4.
4.	David P. Gustafson	2	5	Replace "*code*" with "*Code*".	***Persuasive Editorial*** *ACI CODE-562-21, "Assessment, Repair and Rehabilitation of Existing Concrete Structures—Code Requirements and Commentary," was developed to provide design professionals a code for the assessment of the damage and deterioration, and the design of appropriate repair and rehabilitation strategies. The Ceode provides minimum requirements for assessment, repair, and rehabilitation of existing structural concrete buildings, members, systems and where applicable, nonbuilding structures. ACI 562-19 was specifically developed to work with the International Existing Building Code (IEBC) or to be adopted as a stand-alone code.*

5.	David P. Gustafson	2	16	Replace “this code” with “this Code”.	***Persuasive Editorial*** 1.4—Applicability of this Ceode
6.	Gwenyth R. Searer. S.E.	3	9	Add “when an existing building code is not adopted” to the end of this line to clarify the second of the two conditions.	***Persuasive Editorial*** **1.1—Scope** This Code shall apply to assessment, repair, and rehabilitation of existing concrete structures as: 1. A code supplementing an existing building code, or 2. A stand-alone code for existing concrete structures when an existing building code is not adopted.
7.	David P. Gustafson	3	44	The party “licensed design professional” appears in Line 44. Other parties in this Code are Owner, building official, contractor. Only the party “Owner” is capitalized in the Code. What is the rationale for capitalizing “Owner”? Or why aren’t the other parties capitalized?	***Persuasive Editorial*** owner is revised to consistently be shown as lower case, including in the definition. There is no precedent elsewhere in the standard to capitalize this term. Will be reviewed by ACI Staff for consistency prior to publishing.
8.	Gwenyth R. Searer. S.E.	4	41-42	If you do not accept my comment to move this term to the definition section, then you need to add “Term” between “The” and “existing building code”. Otherwise, the sentence is grammatically awkward	***Persuasive Editorial*** - added term. **1.~~2~~4.3** The term “existing building code” refers to the code adopted by the authority having jurisdiction that regulates existing buildings or structures.
9.	Gwenyth R. Searer. S.E.	4	47-48	If you do not accept my comment to move this term to the definition section, then you need to add “Term” between “The” and “original building code”. Otherwise, the sentence is grammatically awkward	***Persuasive Editorial*** - added term. **1.~~2~~4.4** The term “original building code” refers to the general building code adopted by the authority having jurisdiction at the time the existing structure was permitted for construction.
10.	Gwenyth R. Searer. S.E.	4	35	“Nonstructural” is one word.	***Persuasive Editorial*** this is consistent with ASCE 7. ACI staff will be review.
11.	Gwenyth R. Searer. S.E.	5	9-10	If you do not accept my comment to move this term to the definition section, then you need to add “Term” between “The” and “current building code”. Otherwise, the sentence is grammatically awkward	***Persuasive Editorial.*** **1.2.5** The term “current building code” refers to the general building code adopted by the authority having jurisdiction that regulates new building design and

					construction.
12.	David P. Gustafson	5	14	Replace "computed" with "calculated". According to the late Gene Corley, "calculated" is preferred in building codes.	***Persuasive Editorial*** **R1.24.5** The current building code establishes the design and construction regulations for new construction. Strength design regulations of the current building code typically include: (a) Required strengths ~~computed~~ calculated using combinations of factored loads (strength-design demands) (b) Design strengths (capacities) based on testing of materials, members, and systems (c) Analytical methods used to calculate member and system capacity (d) Strength reduction factors that have been established to be consistent with reliability indices used with the strength-design demands
13.	Gwenyth R. Searer. S.E.	5	40	What referenced standards? Are you talking about standards referenced by the building code that governs existing buildings? Or are you talking about standards referenced in ACI 562? It would be improper to invalidate or supersede the standards referenced by the IEBC, for example, because that may create unintended consequences in the administration of that code. You should only override standards referenced by ACI 562. Please clarify that you mean to override only standards referenced by ACI 562.	***Persuasive Editorial. See text change below***. **1.5.2** If provisions in this Code conflict with requirements of ~~referenced~~ standards referenced within this Code, this Code shall govern.
14.	Gwenyth R. Searer. S.E.	6	5-6	I am not even sure what "model testing" is, and it is not defined. Change "model testing" to "scale model testing" so that the intent of this sentence is made clear.	***Persuasive Editorial*** **R1.5.3** New methods of design, new materials, and new uses of materials for repair and rehabilitation usually undergo a period of development before being permitted by a code. Provision 1.5.3 mirrors IEBC 104.11 that permits building official approval of alternative methods, design, or materials on a project-by-project basis, provided that the alternative is demonstrated to the satisfaction of the

					building official to provide equivalent quality, strength, effectiveness, fire resistance, durability and safety. For systems considered under 1.5.3, specific tests, factored load combinations, strength reduction factors, deflection limits, and other pertinent requirements should be set by the authority having jurisdiction and should be consistent with the intent of this Code. Provision 1.5.3 does not apply to scale model testing used to supplement calculations or to strength evaluation of existing structures.
15.	Gwenyth R. Searer. S.E.	7	1	"Maintenance of the repair" doesn't make sense in the context of this sentence. Change to "Methods for maintenance of the repair" or "Procedures for maintenance of the repair" or "Suggestions for maintenance of the repair".	***Persuasive Editorial. Struck last two sentences. See below for text modification.*** **R1.6.1** The basis of design provides a summary of the assessment of the existing structure and a summary of the construction documents from original construction or prior rehabilitation used in developing the basis of design. The basis of design can be documented in a written report or included in construction documents. Information on some structures may be unavailable or unnecessary if strengthening is not required and should be so documented in the basis of design. The licensed design professional should review requirements of the authority having jurisdiction to determine the information to include in the basis of design documentation and filing requirements for the basis of design. Items that may be documented in the basis of design include: (a) Detailed description of the structure, including age of construction, structural systems, identified original building code, and past and current uses (b) Documentation of potentially dangerous structural conditions in the work area of the structure determined in the assessment (c) Documentation of substantial structural damage in the work area (d) Members and systems of the work area requiring increase in capacity beyond the demands of the original building code

					(e) Conditions and details of the proposed rehabilitation work (f) Assessment criteria and findings (g) Design-basis code criteria and basis of rehabilitation design (h) Shoring requirements such as loads to be resisted and spacing of shoring members (i) Quality assurance and quality control (QA/QC) requirements (j) Types and frequency of future inspection (k) Types and frequency of future maintenance (l) Recommendations to address serviceability conditions A maintenance protocol should be provided in the basis of design, or in as-built or close-out documents. A maintenance protocol that addresses project-specific conditions provides the most effective method to ensure durability and should be established as part of the repair and rehabilitation design. The protocol should include required inspections and intervals between inspections, after completion of the repair or rehabilitation. Maintenance and frequent preventative approaches that occur early in the service life of the structure generally result in improved service life with less interruption and a lower life-cycle cost (Tuutti 1980; ACI 365.1R). Recommendations should be provided to the owner on inspection and maintenance to be undertaken during the remaining design service life of the repair material or the repaired part of the structure. ~~Maintenance of the repair can be incorporated in the instruction manuals from the licensed design professional, contractor, or product manufacturers. Documents and records of observations, inspections and tests should be provided to the Owner as necessary for future work.~~
16.	David P. Gustafson	7	20	Revise Line 29: (f) ~~Development~~ Embedment length of reinforcement and location and length of lap splices	***Persuasive Editorial*** modified to include embedment, development and lap splice lengths. **R1.6.2** As applicable, the construction documents may consist of drawings and specifications if needed, and should indicate:

					(a) Name and date of issue of the building code and supplements to which the assessment, repairs, or rehabilitation conforms (b) Design assumptions and repair requirements including specified properties of existing and remedial materials used for the project and the strength requirements at stated ages or stages of construction (c) Details, locations and notes indicating repair types, materials, preparation requirements, and other pertinent information to implement the repairs, strengthening, or rehabilitation of the structure (d) Magnitude and location of prestressing forces (e) Anchorage details for prestressing reinforcement (f) ~~Development length of reinforcement and length of lap splices~~Reinforcement embedment, development and lap splice lengths.
17.	Gwenyth R. Searer. S.E.	7	26	The sentence "ACI 563 is a reference specification that is written to be consistent with the requirements of this Code." does not belong here. It comes out of nowhere. Nowhere is ACI 563 referenced in the provisions. It is not even defined in this code. This section is a list of various things that can be on the construction documents. I don't think this sentence belongs in this standard. And it certainly doesn't belong here. Please delete.	***Persuasive Editorial*** sentence changed to indicate ACI 563 is available as a resource. **R1.6.2** As applicable, the construction documents may consist of drawings and specifications if needed, and should indicate: (a) Name and date of issue of the building code and supplements to which the assessment, repairs, or rehabilitation conforms (b) Design assumptions and repair requirements including specified properties of existing and remedial materials used for the project and the strength requirements at stated ages or stages of construction (c) Details, locations and notes indicating repair types, materials, preparation requirements, and other pertinent information to implement the repairs, strengthening, or rehabilitation of the structure (d) Magnitude and location of prestressing forces (e) Anchorage details for prestressing reinforcement

					(f) Reinforcement embedment, development and lap splice lengths. (g) Type and location of mechanical or welded splices of reinforcement (h) Shoring or bracing criteria required before, during, and at completion of the assessment, repair, or rehabilitation (i) Quality assurance program including specific inspections, testing requirements, and acceptance criteria ACI 563 is a reference specification that is available as a resource to users of this Code ~~written to be consistent with the requirements of this Code~~.
18.	Gwenyth R. Searer. S.E.	7	33	I am not even sure what a "model test" is, and it is not defined. Recommend you make it "scale model testing" to match the commentary.	***Persuasive Editorial.*** **1.6.4** Load testing and scale model testing shall be permitted to supplement calculations.
19.	Gwenyth R. Searer. S.E.	8	1-2	The second half of this sentence is nonsensical… "the IEBC provides a limit developed by the ICC"? What does that mean?	***Persuasive Editorial*** language is struck as it is agreed that it does not add. **R1.7.1** The provisions of this Code are intended to be used in combination with the existing building code. The existing building code provides criteria for evaluation, when required, and criteria for repair or rehabilitation, when required. These existing building code criteria are supplemented by 1.7.2 through 1.7.9. The code governing existing buildings in the United States is commonly the IEBC~~, which provides a limit developed by the International Code Council (ICC)~~. The IEBC provides limits regarding~~a limit for~~ the extent of damage that can be repaired using the original building code.
20.	Gwenyth R. Searer. S.E.	8	2-3	The IEBC contains more than just one limit, and it may just require analysis if certain limits are exceeded. Consequently, "The IEBC provides a limit for the extent of damage" should be changed to "The IEBC provides limits regarding the extent of damage…" and "…; beyond these limits, analysis and/or upgrade may be required" should be added to the end of Line 3. It will then read "The IEBC provides limits regarding the extent of damage that can be repaired using the original	***Persuasive Editorial*** **R1.7.1** The provisions of this Code are intended to be used in combination with the existing building code. The existing building code provides criteria for evaluation, when required, and criteria for repair or rehabilitation, when required. These existing building code criteria are supplemented by 1.7.2 through 1.7.9. The code governing existing buildings in the United States is

				building code; beyond these limits, analysis and/or upgrade may be required."	commonly the IEBC~~, which provides a limit developed by the International Code Council (ICC)~~. The IEBC provides limits regarding~~a limit for~~ the extent of damage that can be repaired using the original building code.
21.	Gwenyth R. Searer. S.E.	8	8-9	The sentence that starts of "Use of the current building code" is misleading and wrong. The point you are trying to make is that use of the current building code for new construction may result in UNREASONABLY or OVERLY conservative assessment. Engineers want to be reasonably conservative because if you're not conservative, you are underconservative. But engineers also don't want (or at least shouldn't want) to be unreasonably or overly conservative. Please add "unreasonably" or "overly" to the phase "conservative assessment."	***Persuasive Editorial*** "an overly" was used. **R1.7.2** The current building code is always permitted as the design-basis code because it provides an acceptable level of safety. Use of the current building code may, however, result in ~~a~~ an overly conservative assessment of an older structure. Therefore, the choice to use this option should be given careful consideration. The licensed design professional should review ~~use of~~of the benefits and drawbacks of using the current building code with the Owner at the start of the project.
22.	Gwenyth R. Searer. S.E.	8	10	Add "benefits and drawbacks regarding" between "review" and "use of the current building code". "Reviewing the building current building code with the Owner" would literally mean showing the owner how to use the building code. What engineers should be doing is reviewing benefits and drawbacks regarding use of the current building code.	***Persuasive Editorial*** **R1.7.2** The current building code is always permitted as the design-basis code because it provides an acceptable level of safety. Use of the current building code may, however, result in ~~a~~ an overly conservative assessment of an older structure. Therefore, the choice to use this option should be given careful consideration. The licensed design professional should review ~~use of~~of the benefits and drawbacks of using the current building code with the Owner at the start of the project.
23.	David P. Gustafson	8	27	Consider capitalizing "seismic design categories", i.e. "Seismic Design Categories".	***Persuasive Editorial*** this is consistent with ASCE 7. **1.7.5.1** Repairs that do not change the strength, stiffness, or ductility of the seismic-force-resisting system are permitted for structures in all S~~s~~eismic ~~d~~Design C~~c~~ategories.
24.	David P. Gustafson	8	32	***41.1*** The term "design events" appears in Line 32. Other events are: extraordinary event, p. 13, Line 26; also on P. 13, Line 50 extreme event, p.15, Line 50 historical event, p. 14, Line 31	***41.1 Persuasive Editorial*** the term has been replace with "seismic loading." **R1.7.5.1** The licensed design professional should evaluate any required repairs to the seismic-force-resisting system of a structure and determine how the repairs will affect the performance of the

				unexpected events, p. 15, Line 28 earthquakes ~~seismic events~~, p. 17, Line 16 ***41.2*** Consider adding a definition of "events" to Section 2.2.	structure under design loadings. Changes in the strength, stiffness, or ductility of the structure may results in unintended distribution of load during ~~design event~~seismic loading. Repairs to the seismic-force-resisting system can be designed using this Code if the repairs do not affect the strength, stiffness, or ductility of the structure. Seismic performance evaluation of existing structures is described in FEMA P-58 and FEMA P-695. ***42.2 Future Work***
25.	Gwenyth R. Searer. S.E.	8	36	Where is the edition of ASCE 7 spelled out? At least three other portions of this draft of ACI 562 refer to ASCE 7-16, so presumably that is the edition you wish users to use, but it is hardly clear. Note that ASCE 7-22 is just wrapping up its public comment portion and will likely be proposed for adoption into the next IBC (and IEBC). Is the intent of ACI to refer to an older version of ASCE 7 when referring to Seismic Design Categories as well as other provisions of ASCE 7?	***Persuasive Editorial*** - see response to #4***.*** The references will be reviewed for consistency.
26.	David P. Gustafson	8	43	Revise Line 43: 1.7.5.3 This Code ~~is~~ shall not ~~to~~ be used for repair or	***Persuasive Editorial*** **1.7.5.3** This Code ~~is~~ shall not ~~to~~ be used for repair or rehabilitation of elements of seismic force-resisting systems that result in a change in the strength, stiffness or ductility of those elements from their pre-damage condition for structures in Seismic Design Categories B through F in accordance with ASCE/SEI 7.
27.	Gwenyth R. Searer. S.E.	9	35	The sentence that starts of "However, this may result" is misleading and wrong. The point you are trying to make is that use of the current building code for new construction may result in UNREASONABLY or OVERLY conservative assessment. Engineers want to be reasonably conservative because if you're not conservative, you are underconservative. But engineers also don't want (or at least shouldn't want) to be unreasonably or overly conservative. Please add "unreasonably" or "overly" to the phase "conservative assessment."	***Persuasive Editorial*** "an overly" used to match #36. **R1.8.2** As stated in R1.7.2, it is always permitted to use the current building code as the *design-basis code*. However, this may result in an overly ~~a~~ conservative assessment of an older structure. The licensed design professional should review benefits and drawbacks of using ~~use of~~ the current building code with the Owner at the start of the project.
28.	Gwenyth R. Searer. S.E.	9	36	Add "benefits and drawbacks regarding" between "review" and "use of the current building code". "Reviewing the building current building code with the Owner" would literally mean showing the owner how to use the building code. What engineers should be doing is reviewing benefits and drawbacks	***Persuasive Editorial*** same as #38. **R1.8.2** As stated in R1.7.2, it is always permitted to use the current building code as the *design-basis code*. However, this may result in an overly ~~a~~ conservative assessment of an older

				regarding use of the current building code.	structure. The licensed design professional should review benefits and drawbacks of using ~~use of~~ the current building code with the Owner at the start of the project.
29.	Gwenyth R. Searer. S.E.	9	43	Replace the word "provided" with "conducted".	***Persuasive Editorial*** **1.8.4.1** Preliminary assessment of an existing structure shall be conducted within the *work area* ~~provided~~. The preliminary assessment shall include investigation and review of the structure, construction documents, reports, local jurisdictional codes, and other available documents. Existing in-place conditions shall be visually or otherwise investigated to establish existing geometry and structural conditions.
30.	Gwenyth R. Searer. S.E.	9	43	Add the words "within the work area" to the end of the first sentence so it reads "Preliminary assessment of an existing structure shall be conducted within the work area." The commentary (lines 48-49) correctly recognizes that we don't want engineers having to assess the whole structure when they are just working on a part of a structure. The provisions should likewise be narrowed down to just the area being worked on. Further, the need to narrow the required assessment down to the work area is echoed in the commentary on page 14, line 25.	***Persuasive Editorial*** **1.8.4.1** Preliminary assessment of an existing structure shall be conducted within the *work area* ~~provided~~. The preliminary assessment shall include investigation and review of the structure, construction documents, reports, local jurisdictional codes, and other available documents. Existing in-place conditions shall be visually or otherwise investigated to establish existing geometry and structural conditions.
31.	Gwenyth R. Searer. S.E.	10	34-35	Suppose I am just repairing a spall. This provision requires me to determine the "in-place strength of the existing structure". That is an incredibly onerous requirement. Why would ACI want every engineer designing a spall repair to have to determine the "in-place strength of the structure"? Strongly recommend deletion of this requirement.	***Persuasive editorial - See modified language below.*** **1.8.4.4** If required, t~~T~~he in-place strength of the existing structure shall be determined considering in-place geometry and material properties including effects of material deterioration and other deficiencies. If material properties are not available, a preliminary assessment is permitted using material properties in accordance with 6.3.2. Disagree with public comment. See Section 1.8.4.1 including commentary.
32.	Gwenyth R. Searer. S.E.	10	38	This commentary conflicts with the provision it describes. The commentary says "If required as part of the preliminary assessment" but the provision simply requires it (i.e., "shall be determined"). Fix the provision (strongly recommended) or delete this phase in the commentary (not recommended at all).	***Persuasive editorial***. See comment above.

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33.	Gwenyth R. Searer. S.E.	11	2-5	This is not a grammatically correct sentence. I don't know what you are trying to say. You list "damage, displacements, deterioration, structural deficiencies". But then you throw in "or performance is observed…" Do you need an "or" between "deterioration" and "structural deficiencies"? Or does "is observed during the preliminary assessment" need to be stricken? I suspect the latter would help. *"…if a member or structure exhibits damage, displacements, deterioration, structural deficiencies, or performance that is unexpected or inconsistent with available design and construction documents or code requirements…"*	***Persuasive Editorial.*** **1.8.4.5** A structural assessment in accordance with Chapter 6 shall be performed if a member or structure exhibits damage, displacements, deterioration, structural deficiencies, or performance ~~is observed during the preliminary assessment~~ that is unexpected or inconsistent with available design and construction documents or code requirements in effect at the time of construction.
34.	David P. Gustafson	11	10	Consider replacing "judgement" with "judgment".	***Persuasive Editorial.*** **R1.8.4.5** The preliminary assessment is generally the first portion of the work necessary to determine the rehabilitation category. Based upon preliminary assessment results, a structural assessment may be required to determine the extent of damage or if potentially dangerous structural conditions are present. However, in some cases, the licensed design professional may deem that a structural assessment is not required based on judg~~e~~ment in accordance with 1.8.4.1 through 1.8.4.4.
35.	David P. Gustafson	11	19	Consider capitalizing "seismic design categories", i.e. "Seismic Design Categories".	***Persuasive Editorial*** consistent with ASCE 7. **1.8.6.1** Repairs that do not change the strength, stiffness, or ductility of the seismic-force-resisting system are permitted for structures in all S~~s~~eismic D~~d~~esign C~~c~~ategories.
36.	Gwenyth R. Searer. S.E.	11	50	What is Section R1.7.7? I was unable to find this section of commentary.	***Persuasive Editorial*** reference deleted. ~~**R1.8.8** Refer to R1.7.7~~
37.	Gwenyth R. Searer. S.E.	13	16	Is "L, live load acting on the structure" different from the design live load? Is it really intended be the live load acting on the structure at a particular instant in time, which is what the definition implies.	***Persuasive Editorial -*** Change to L– effect of service live load to be consistent with ACI 318. L = ~~live load acting on the structure~~effect of service live load
38.	David P.	13	27	Replace "computed" with "calculated". According to the late	***Persuasive Editorial.***

	Gustafson			Gene Corley, "calculated" is preferred in building codes.	Rex = nominal resistance of the structure during an extraordinary (that is, low-probability) event ~~computed~~ calculated using the probable material properties
39.	Gwenyth R. Searer. S.E.	13	30	Is "S, snow load acting on the structure" different from the design snow load? Is it really intended be the snow load acting on the structure at a particular instant in time, which is what the definition implies.	***Persuasive Editorial*** Change to S – effect of service snow load to be consistent with ACI 318. *S* = ~~snow load acting on the structure~~effect of service snow load *D* = ~~dead load acting on the structure~~effect of service dead load
40.	David P. Gustafson	13	33, 35, 37, 39	Not keen on co-mingling "LRFD" with strength design in a code for concrete structures. Hence, consider deleting "(LRFD)" in four places. Deleting "(LRFD)" does not affect the descriptions of the four notations.	***Persuasive Editorial*** U = required strength or demand using nominal loads and factored load combinations for strength design provisions ~~(LRFD)~~ Uc = required strength or demand using nominal loads of the current building code and factored load combinations of ASCE/SEI 7 for strength design ~~(LRFD)~~ Uo = required strength or demand using nominal loads and factored load combinations of the original building code for strength design ~~(LRFD)~~ Uo* = required strength or demand using nominal loads of the original building code and factored load combinations of ASCE/SEI 7 for strength design ~~(LRFD)~~
41.	Gwenyth R. Searer. S.E.	14 (15)	30-35	This definition of dangerous is in conflict with the definition of dangerous in the IEBC. The term "service load" was removed from the IEBC because it does not have a formal definition, and it was not clear to many people exactly what it meant. The definition should be revised to match that in the IEBC.	***Persuasive Editorial*** revised to match 2021 IEBC. **dangerous**—designation applied to any building, structure, or portion thereof that meets any of the following conditions: 1. The building or structure has collapsed, has partially collapsed, has moved off its foundation, or lacks the necessary support of the ground. 2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance, or ornamentation of the concrete building or structure under actual

					loads already in effect; or under snow, wind, rain, flood, earthquake or other environmental loads when such loads are imminent.~~service loads.~~
42.	Gwenyth R. Searer. S.E.	14 (15) and all	37-40 and all	This portion of the commentary seems to make little sense. If the definition of dangerous includes a set of things, call them "X", then the definition of potentially dangerous must necessarily include all of "X" plus other things that are only potentially dangerous, right? But the commentary only says that potentially dangerous conditions may include those defined as dangerous. How could a dangerous thing not ALSO be included in the definition of potentially dangerous? Or is the intent that potentially dangerous conditions typically will NOT include things that are known to be dangerous? Or is the intent to demonstrate that the definition of dangerous in ACI 562 is intentionally different from that in the IEBC (which it now is), so that maybe things that are dangerous in the IEBC are not even potentially dangerous in ACI 562. I have trouble figuring out how something that is dangerous is not ALSO potentially dangerous. Potentially is a very bad word to begin a technical phrase with because it means "possible". Pretty much everything is possible. Implying that something could be dangerous but not potentially dangerous is particularly nonsensical when considered in conjunction with the definition of the term "potentially dangerous", which is specifically defined as meeting the definition of dangerous or a whole bunch of other undefined things. Clearly if something is dangerous, the definition of potentially dangerous means that it must also be potentially dangerous. Substantive changes to both the definition and the commentary are required. I also strongly recommend that ACI 562 stop trying to do an end-around the provisions of the IEBC like this. Later on, it seems like the intent is for the detailed assessment to identify all potentially dangerous conditions. But this makes little sense. What you should want is for any potentially dangerous conditions to be identified early on and then the engineer works through their assessment and eliminates all of the conditions that are not actually dangerous. Even better is for there never to be such a thing as "potentially	***Persuasive Editorial*** 2nd and 3rd sentences deleted. **dangerous**—designation applied to any building, structure, or portion thereof that meets any of the following conditions: 1. The building or structure has collapsed, has partially collapsed, has moved off its foundation, or lacks the necessary support of the ground. 2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance, or ornamentation of the concrete building or structure under actual loads already in effect; or under snow, wind, rain, flood, earthquake or other environmental loads when such loads are imminent.~~service loads.~~ **Commentary:** This definition has been adopted from the IEBC. ~~Potentially dangerous conditions of an existing concrete member, system, or structure may include those defined as dangerous from the IEBC. Circumstances may render some conditions defined as dangerous to be potentially dangerous within a limited period of time or may be concluded to be less of an imminent hazard.~~

				dangerous". At most, this should be a transitory designation in the engineer's mind until they complete their assessment and determine what is dangerous and what is not. There should be no definition of "potentially dangerous" and it should not be anything more than a fleeting possibility before the engineer either rules it actually dangerous or not dangerous as part of their assessment.	
43.	Gwenyth R. Searer. S.E.	14 (15)	37	The first sentence of this commentary section is not true. Given that the definition of dangerous has changed in the IEBC, the commentary needs to state, "While this definition was originally adopted from the IEBC, it no longer matches the definition of the IEBC." Of course, why ACI wants a definition that conflicts with that of the IEBC is beyond me.	***Persuasive Editorial*** see response to #76.
44.	Gwenyth R. Searer. S.E.	16	31-39	The definition of existing structure is different from that in the IEBC. While the commentary says that's okay, and tells the user to go ahead and use the definition in the IEBC, that instruction really needs to be in the provisions of ACI 562 not just the commentary -- particularly when you appear to be rejecting the definition in the overarching governing existing building code for most of the United States.	***Persuasive Editorial*** definitions (1) and (2) indicated. Will be also looked at as future work. **existing structure**—~~structure~~ (1) when used in conjunction with an existing building code, a building erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued; (2) when not used in conjunction with an *existing building code*, building for which a legal certificate of occupancy has been issued; for structure not covered by a certificate of occupancy, a structure that is complete and permitted for use or otherwise legally defined as an existing structure or building~~; buildings for which a legal certificate of occupancy has been issued~~. **Commentary:** ~~The d~~Definition 1 is consistent with the IEBC. Definition 2 is different from the IEBC definition of an existing building. ~~The IEBC definition is "A building erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued." If this Code is used with the IEBC, use of the IEBC definition is appropriate.~~
45.	Gwenyth R. Searer. S.E.	16	11-15	This appears to be a very long, run-on sentence. Can you shorten it, simplify it, or break it down into smaller sentences? The phrase "which may vary widely depending on the acquired information, test results, computational models, and analyses" modifies only "demand". Is that really your intent? I don't	***Persuasive Editorial*** see proposed edits. **evaluation**—the process of determining and judging the adequacy of a structure, member, or system for its current

				understand how the demand will vary widely depending on the acquired information, test results, computation models, and analyses. The demand is the demand. The capacity is the capacity. I guess I could understand if it said, "estimates of demand" and "estimates of capacity".	intended use or performance objective. **Commentary**: This definition is adapted from ASCE/SEI 11 In a structural evaluation, the licensed design professional should determine the structural adequacy, serviceability, and durability of an existing structure based upon compiled data and other knowledge. An evaluation may require professional judgment to gage structural adequacy. Structural analyses and member capacity calculations may be required to determine possible ranges of existing structural capacities and variations in demands. The goal of the evaluation process is to appraise the in-place condition to determine adequacy for current or proposed future use. Structural evaluation requires determining capacity and demand, which may vary widely depending on the acquired information, test results, computational models, and analyses~~;~~. D~~d~~etermining the demand-to-capacity ratios; and judging structural reliability limits~~, which~~ may be open to interpretation based on project requirements, structural experience, knowledge, and past performance.
46.	David P. Gustafson	16	1	Consider replacing the term "**equivalent cover**" with "**equivalent concrete cover**".	***Persuasive Editorial.*** **equivalent concrete cover**—a system to supplement insufficient concrete cover to provide durability or fire protection equivalent to the specified minimum cover.
47.	Gwenyth R. Searer. S.E.	18	2-6	The proposed definition of "stability" includes "sway instability" and "sliding failure". How about replacing "sway instability" with "lateral stability" and "sliding failure" with just "sliding"?	***Persuasive Editorial.*** **stability, global**—stability of the overall existing structure with respect to vertical support, uplift, overturning, ~~sway~~ lateral instability, or sliding ~~failure~~.
48.	Gwenyth R. Searer. S.E.	18	2-3	Delete "props or posted used for". Beams can be part of shoring, as can struts, as can tension elements.	***Persuasive Editorial*** **shoring**—~~props or posts used for~~ temporary support of excavations, formwork, members during repairs, or potentially dangerous structures; the process of erecting shores.
49.	Gwenyth R. Searer. S.E.	18	8	Delete "the process of". Those words are superfluous and add nothing to the definition.	***Persuasive Editorial*** **strengthening**—~~process of~~ increasing the capacity of an existing structure or a portion thereof.

50.	Gwenyth R. Searer. S.E.	18	10	Need a comma between “of” and “a”.	***Persuasive Editorial*** **structural analysis**—process of using engineering mechanics to determine internal demands on, and capacities of, a structure, member, or system.
51.	Gwenyth R. Searer. S.E.	18	13	Why is “existing building code” italicized?	***See response to comments above.***
52.	David P. Gustafson	18	22	Replace “owner” with “Owner”.	***Persuasive Editorial*** see response to #11, will always be lower case. **work area**—that portion or portions of a structure consisting of all areas indicated in the construction documents or identified by the o~~O~~wner and licensed design professional for assessment; it excludes portions of the structure where incidental work entailed by the intended work must be performed and portions of the structure where work not initially intended by the owner is required by this Code.
53.	Gwenyth R. Searer. S.E.	19	2-7	The title says that Chapter 4 governs “assessment and repair” of existing structures, but Section 4.1.1 says it governs “assessment and repair and rehabilitation”. I previously pointed out the problematic nature of including the definition of “repair” in the vague term “rehabilitation”. This is a good example of the consequences of that.	***Persuasive Editorial*** revised to include rehabilitation to match response to earlier comments throughout chapter 4. **CHAPTER 4—CRITERIA AS A STAND-ALONE CODE FOR ASSESSMENT, ~~AND~~ REPAIR, AND REHABILITATION OF EXISTING STRUCTURES** **4.1—General** **4.1.1** This Chapter applies for the assessment and for the repair and rehabilitation of existing structures and their components if this Code is used as a stand-alone code. **R4.1.1** The assessment, ~~and~~ repair, and rehabilitation design criteria and associated demand-to-capacity ratios used in this Chapter were developed to be consistent with the performance-based procedures presented in 1.3.1.3 of ASCE/SEI 7-16. The licensed design professional for the project should evaluate the applicability of this Chapter to non-building structures (for example, environmental

					engineering structures such as those addressed in ACI 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary) as these structures may be designed with procedures that are not compatible with the performance-based procedures of ASCE/SEI 7. **4.2—Criteria for the assessment, ~~and~~ repair, and rehabilitation design of existing concrete structures** **R4.2—Criteria for the assessment, ~~and~~ repair, and rehabilitation design of existing concrete structures**
54.	Gwenyth R. Searer. S.E.	19	25-28	I see definitions for "design-basis code" and "design-basis criteria", but what are "design-basis code criteria"? You instruct the user to use the design-basis code criteria consistently for all work done per ACI 562, but I cannot find a definition for this term. Please provide a definition. Note that I submitted a public comment about this in 2019 as well.	***Persuasive editorial*** **4.2.1** The design-basis ~~code~~ criteria of the project shall be determined based upon the results of the preliminary assessment as described in 1.8 or the detailed assessment as described in Chapter 6, if performed, using the requirements in this Chapter. The design-basis ~~code~~ criteria shall be used consistently for all assessment, repair, and rehabilitation design in the work area or areas of the structure.
55.	Gwenyth R. Searer. S.E.	19	16	Consider replacing "seismic resistance" with "earthquake resistance".?	***Persuasive Editorial*** this is a defined term. **4.1.2** The design-basis code for the project shall be based on requirements set forth in this Chapter.
56.	David P. Gustafson	22	8	Consider replacing "the current lateral-load-resisting nominal capacity of the structure" with "nominal capacity of the current lateral-load resisting system of the structure".	***Persuasive editorial.*** **4.4.2** Substantial structural damage to vertical members of the lateral-force-resisting system shall have occurred if, in any story, the shear walls or columns of the lateral-force-resisting system are damaged such that the nominal capacity of the current lateral-load-resisting system ~~nominal capacity~~ of the structure ($\sum R_{cn}$) in any horizontal direction is reduced more than 33 percent from its pre-damage condition ($\sum R_n$). This relationship is given by Eq. (4.4.2).

57.	David P. Gustafson	22	47	Replace “earthquake” with “an earthquake”.	***Persuasive editorial.*** **4.4.4.1** Structures with substantial structural damage caused by an earthquake shall be assessed or rehabilitated for load combinations that include earthquake effects. The seismic design provisions of ASCE/SEI 41 shall be: (a) Earthquake Hazard Level BSE-1E with the Basic Performance Objective of “Life Safety” for Risk Category I, II, or III (ASCE/SEI 7) and of “Immediate Occupancy” for Risk Category IV and (b) Earthquake Hazard Level BSE-2E with the Basic Performance Objective of “Collapse Prevention” for Risk Category I, II (ASCE/SEI 7) and of “Life Safety” for Risk Category III and IV (ASCE/SEI 7).
58.	Gwenyth R. Searer. S.E.	23	11-14	This language about there being reason for an engineer to question the capacity of the member… what does that mean? The damage or deterioration has been identified and found to not rise to the level of substantial structural damage, so what else is there to do but to repair it. Further, faulty construction is not included in any definition of substantial structural damage. So asking someone if faulty construction is less than substantial structural damage does not make sense.	***Persuasive Editorial.*** **4.5.1** If a member, system, or structure in the work area has deterioration, contains faulty construction, or damage determined to be less than substantial structural damage, ~~and there is a reason for the licensed design professional to question the capacity of the member, system, or structure in the work area,~~ it shall be assessed by checking one of the criteria in 4.5.2, 4.5.3, or 4.5.4. Provisions 4.5.2 through 4.5.4 shall not be applied in combination with each other. Faulty construction is included for clarity.
59.	Gwenyth R. Searer. S.E.	23	20	Please provide a definition of “unsafe conditions.”	***Persuasive editorial*** **R4.5.1** For structures without ~~unsafe~~ dangerous conditions or substantial structural damage, repairs can be made to satisfy the strength requirements of the original building code. Provision~~s~~ 4.5.2 addresses the situation where the original building code was based upon strength design principles. Provision 4.5.3 allows for alternative assessment criteria that may be advantageous if significant changes in demand have occurred. Provision 4.5.4 addresses the situation where

					allowable stress design methods were used in the original design.
60.	David P. Gustafson	23	21	Make "Provisions" singular, i.e., "Provision".	***Persuasive editorial*** **R4.5.1** For structures without ~~unsafe~~ dangerous conditions or substantial structural damage, repairs can be made to satisfy the strength requirements of the original building code. Provision~~s~~ 4.5.2 addresses the situation where the original building code was based upon strength design principles. Provision 4.5.3 allows for alternative assessment criteria that may be advantageous if significant changes in demand have occurred. Provision 4.5.4 addresses the situation where allowable stress design methods were used in the original design.
61.	Gwenyth R. Searer. S.E.	24	8	If "strengthening repairs" are not required, what repairs are required?	***Persuasive editorial*** **4.5.2.2** If $U_o/\phi_o R_{cn}$ is 1.0 or less, repair to strengthen the structure~~strengthening repairs~~ are not required.
62.	David P. Gustafson	28	2	Should "lateral capacity" be replaced with "capacity of lateral-force-resisting system"?	***Persuasive editorial.*** See revised text below. **4.8.4** If the alteration increases design lateral loads, results in a structural irregularity according to ASCE/SEI 7, or decreases the capacity of lateral-force-resisting system ~~capacity~~, the design-basis code criteria for elements of the work area shall be the current building code
63.	Gwenyth R. Searer. S.E.	28	5-9	Why is the licensed design professional mentioned in here? Is there some suspicion that an unlicensed person is going to sneak in and go to 4.8.4.1 and start doing stuff? This requirement is already grammatically complicated enough, and nowhere else is the spectre of an unlicensed person making these calculations raised. Delete.	***Persuasive editorial.*** **4.8.4.1** ~~The licensed design professional~~ It shall be permitted to use, as an alternati~~v~~e, the load demands and capacities from the original building code ~~load demands and capacities~~ for any lateral-force-resisting member, system, or structure in~~of~~ the work area if the demand-to-capacity ratio with alterations using the current building code is not more than the demand-to-capacity ratio without alterations using the original building code increased by

					10 percent.
64.	Gwenyth R. Searer. S.E.	28	5-9	What are "building code load demands"?	***Persuasive editorial.*** **4.8.4.1** ~~The licensed design professional~~ It shall be permitted to use, as an alternat~~iv~~e, the load demands and capacities from the original building code ~~load demands and capacities~~ for any lateral-force-resisting member, system, or structure in~~of~~ the work area if the demand-to-capacity ratio with alterations using the current building code is not more than the demand-to-capacity ratio without alterations using the original building code increased by 10 percent.
65.	Gwenyth R. Searer. S.E.	17	49-50	I hate to sound like a broken record, but I have brought this up every time I have provided feedback to ACI 562, both formally and informally. In the IEBC, actions on a building are either 1) repairs, 2) additions, or 3) alterations. Those are the only categories into which work can be put. So if you are repairing damage, that is a repair. If you are building an addition, either horizontal or vertical, that is an addition. Everything else is an alteration. ACI's decision to add other categories like "rehabilitation" and "retrofit" and "strengthening" merely makes everything more complicated and makes it difficult for ACI to credibly claim that this code can be used in conjunction with the IEBC. Please stick with IEBC terms to avoid conflicting with IEBC definitions and provisions. Further, the term "strengthening" already covers retrofit. Strengthening is defined as "process of increasing the capacity of an existing structure or a portion thereof." Since capacity can be measured in terms of force or in terms of ductility or displacement, the word "retrofit" adds nothing substantive and is already subsumed by the definition of "strengthening". Using one term to describe one thing is preferred to using two terms to describe the same thing. Strongly recommend that you eliminate the term "retrofit" from ACI 562.	***Persuasive -*** The definition can be struck as we are not doing seismic retrofit with the code. The term retrofit was selected for consistency with ASCE 41 / ACI 369. ~~**retrofit** modification of an existing member, system, or structure to increase its strength, ductility, or both as a means of improving the seismic performance of the structure.~~ ~~**Commentary:** This term is used typically to refer to seismic modifications to increase resistance in an existing structure in accordance with ASCE/SEI 41. The definition is adapted from ASCE/SEI 41.~~ ***Future Work*** - look into seismic strengthening vs retrofit
66.	Gwenyth R. Searer. S.E.	19	36-37	What does "Throughout an existing structure, the design-basis code should not change" mean? Don't you really mean "For a given project, the design-basis code should not change?"	***Persuasive.*** **R4.2.1** Structures constructed under previously adopted

				Because one portion of the structure may be repaired according to one design-basis code and then sometime in the future, another portion of the structure may be repaired according to a different design-basis code, right?	codes or before the adoption of a building code may not satisfy all current building code requirements. This Chapter contains specific requirements that determine if existing structures should be repaired or rehabilitated to satisfy the requirements of the original or the current building code, whichever serves as the design-basis code. Local ordinances may also require that a structure be rehabilitated to satisfy the current code. ~~Throughout an existing structure, the design-basis code should not change.~~
67.	David P. Gustafson	19	14	Consider replacing "environmental structures" with "environmental engineering structures".	***Persuasive.*** Revised text for environmental structures **R4.1.1** The assessment and repair design criteria and associated demand-to-capacity ratios used in this Chapter were developed to be consistent with the performance-based procedures presented in 1.3.1.3 of ASCE/SEI 7-16. The licensed design professional for the project should evaluate the applicability of this Chapter to non-building structures (for example, environmental engineering structures such as those addressed in ACI 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary) as these structures may be designed with procedures that are not compatible with the performance-based procedures of ASCE/SEI 7.
68.	Gwenyth R. Searer. S.E.	20	30-42	These provisions and commentary are badly flawed. The term "potentially dangerous structural conditions" includes the word "potentially", which is impossibly vague, since all things may potentially be true, and pretty much all things are possible. It seems odd to require an engineer to "determine" whether "potentially dangerous structural conditions" are present. It seems like maybe something is *potentially* a dangerous structural condition, and then you determine whether it is or is not an actual dangerous structural condition. But to require that engineers *determine* that something is *potentially* a dangerous structural condition seems counterintuitive and wrong. Similarly, the idea in Line 39 that one would review the results of one's assessment to identify potentially dangerous structural	***Persuasive - see edits to 4.3.1 below.*** **4.3.1** If there is a reason for the licensed design professional to question the capacity of the structure or if potentially dangerous structural conditions are observed as a part of the preliminary assessment, an assessment shall be performed in the work area ~~to determine if potentially dangerous structural conditions are present.~~ **R4.3.1** Structural assessments are required if damage, deterioration, structural deficiencies, or behavior are observed during the preliminary assessment that are unexpected or inconsistent with available construction documents. The structural assessment should be performed in accordance with 1.8 or Chapter 6, or both.

				conditions seems backward. Once the assessment is complete, the assessment itself should have already determined whether there were "potentially dangerous structural conditions," right? Further, the assessment should determine whether something is actually dangerous, and not just potentially dangerous. Finally, in Line 42, the loads under which the unacceptable risk of collapse could occur are defined here (i.e., "under service loads). This conflicts with the definition in Chapter 2, which does not define the loads, and conflicts with the wording about "limit state of unacceptably low margin of safety against collapse without supplemental resistance." Is it not clear why the definition of "potentially dangerous structural conditions" in Chapter 2 differs from the de facto definition herein. Is it intentional and designed to convey a different meaning or is it a mistake? I again strongly recommend that you replace this "potentially dangerous structural conditions" term and only use the term "dangerous" as it is defined in the current IEBC, even if the IEBC is not adopted.	Results of the assessment should also be reviewed to identify the presence of potentially dangerous structural conditions, which could include any instability, the potential for imminent collapse of overhead components or pieces (falling debris hazards), or an unacceptable risk of collapse under service load conditions. **Future work** - committee will review potentially dangerous language throughout code.
69.	David P. Gustafson	20	17-21	1. The first sentence in Line 17 recommends review by the licensed design professional (LDP) of the development of existing reinforcing steel. According to ACI Concrete Terminology (ACI CT-20), the term "development length" is defined as "the bonded length required to achieve the design strength of a reinforcement at a critical section". What will the LDP review? Perhaps the intent of the first sentence is that the LDP should examine the conditions related to the anchorage of reinforcement. 2. In the second sentence in Lines 18-19, replace "potential development failure" with "potential anchorage failure". 3. The sentence in Lines 19-21 says the ACI 318 Code may be unconservative for top reinforcing bars. A paper by Feldman and Cairns, 2017 is cited. I don't have a copy of ACI 562-19. Hence, I don't have access to the details of the referenced Feldman and Cairns paper. I think the 2017 paper was published in the ACI Structural Journal. The title of the paper is "Assessing Historical Provisions for Bond of Plain Bars". Note "plain bars" rather than "deformed bars". ACI 318-63 required	***Persuasive - see edits below.*** Agree with parts of the comment. Suggest the following. **R4.2.4** The licensed design professional should review conditions related to anchorage of the ~~the development of~~ existing reinforcing steel. Cracking near the ends of the existing reinforcing steel should be reviewed to determine if the cracking is indicative of potential ~~development~~ reinforcement anchorage failure. Research has shown that development length equations from previous versions of ACI 318 may be unconservative for top reinforcing steel bars (Feldman and Cairns 2017). ~~Over time, c~~Changes in ACI 318 have increased the development length of reinforcing steel. If the basis of design is the current building code, the licensed design professional should consider the following: (a) Assessing demand-to-capacity ratios for the existing

				deformed bars. I don't have access to 318 codes prior to the 1963 edition. 4. The sentence starting on Line 21 says over time changes in ACI 318 . . . The words "over time" are vague. What is the time frame? Provisions for development length of reinforcement including provisions for deformed reinforcing bars were introduced in the 1971 ACI 318 Code. Need to clarify the sentence starting on Line 21.	reinforcing steel using current development length provisions. (b) Confinement details of the reinforcement if assessing seismic resistance. The licensed design professional should determine if structural behavior indicates adequate performance. ACI 224.1R, ACI 437R, and ACI 437.1R provide guidance in judging acceptable performance.
70.	Gwenyth R. Searer. S.E.	20	48-51	It is unclear whether tsunami loads and flood loads are excluded or included in this analysis. Only seismic forces are specifically excluded. Tsunami loads and flood loads are both fluid loads, but I am not sure if that was the intent. The commentary also only talks about excluding earthquake loads. Please clarify whether tsunami loads and flood loads are included or excluded in this analysis.	~~***Future Work***~~***Persuasive - see edits below.*** Code Commentary can be changed to address comment. Fluid, gravity, soil and wind loads are clear terms. Flood and Tsunami are distinct, and are obviously not included. **4.3.2** For gravity, fluid, soil, and wind loads, potentially dangerous structural conditions exist in members or structures if the demand-to-capacity ratio is greater than 1.5, as given in Eq. (4.3.2). $U_c/\phi R_{cn} > 1.5$ (4.3.2) In Eq. (4.3.2), U_c is the strength-design demand determined by using the nominal gravity, fluid, soil, and wind loads identified in the current building code and the factored load combinations of ASCE/SEI 7, excluding seismic, flood, and tsunami forces; and ϕR_{cn} is the current in-place nominal capacity adjusted by the strength reduction factor (ϕ) in 5.3 or 5.4. **R4.3.2** Demand-to-capacity ratios are used to quantify the adequacy of the member or structure. The threshold demand-to-capacity ratios determine when different levels of intervention may be required. This Chapter provides defines how the applicable demands and capacities are determined. Demands may be determined based upon factored loads associated with *current building codes* (U_c as defined in 4.3.2) or factored loads used for the original design (U_o as defined in 4.5.2) of

					the structure. The calculated capacity of the structure will vary depending upon the condition of the structure and extent of evaluation used to confirm as-built properties of the structure. In assessing potentially dangerous structural conditions, the strength-design demand of Eq. (4.3.2) combines current building code nominal gravity loads (dead, live, and snow) with lateral loads from fluid, soil and wind (excluding seismic, flood and tsunami forces) using factored load combinations of ASCE/SEI 7-16. The demand-to-capacity ratio for unsafe conditions was developed consistent with the performance-based procedures contained in 1.3.1.3 of ASCE/SEI 7-16. A demand-to-capacity ratio greater than 1.5, calculated using Eq. (4.3.2), represents a condition with limited to no margin of safety against failure for ASCE/SEI 7 loads (Stevens and Kesner 2016; Stevens et al. 2019).
71.	Gwenyth R. Searer. S.E.	20	7	I know what a new member is, but what is a reinforcing member? What is being reinforced? If you add a reinforcing member, why is it not new? Why can you not repair the member?	***Persuasive.*** **4.2.3** The current building code shall be used to detail new members and connections between new concrete members and existing construction. If the original building code is used as the design-basis criteria for repairs, new or ~~reinforcing members~~supplemental elements built integrally with the existing concrete structure shall be designed using either the original building code or the current building code.
72.	Gwenyth R. Searer. S.E.	21	34-38	Please provide a definition for “potentially hazardous seismic conditions”. This term is undefined, as is just the term “potentially hazardous”.	***Persuasive.*** **4.3.3** Assessment criteria for seismic resistance, unless addressed by the authority having jurisdiction, are limited to ~~potentially hazardous~~ conditions associated with Structural Performance Level, Collapse Prevention of structures in Seismic Design Category D, E, and F of ASCE/SEI 7 using Earthquake Hazard Level, BSE-1E and shall be determined using ASCE/SEI 41 and this Code. The design-basis criteria to address ~~potentially hazardous~~ seismic conditions in concrete structures shall be this Code and ASCE/SEI 41. **R4.3.3** Compliance with ASCE/SEI 41 for Structural Performance Level, Collapse Prevention using an applicable Earthquake Hazard

					Level BSE-1E should be reviewed and approved by the authority having jurisdiction for the assessment of potentially hazardous seismic conditions of concrete structures. Assessment of ~~potentially hazardous~~ seismic conditions for concrete structures is not required, but may be considered, for structures in regions of low or moderate seismicity. If no requirements for ~~potentially hazardous~~ seismic structural conditions are provided by the authority having jurisdiction, the licensed design professional should refer to ATC-78, the IEBC, and ASCE/SEI 41 appendices for guidance.
73.	Gwenyth R. Searer. S.E.	21	34-38	Please include code language that explains what the term "potentially hazardous conditions associated with Structural Performance Level, Collapse Prevention" means. ASCE 41 does not use the term "potentially hazardous" at all.	***Persuasive*** See response to 119.
74.	Gwenyth R. Searer. S.E.	21	37-38	How is a code official or a design engineer supposed to interpret this sentence: "The design-basis criteria to address potentially hazardous seismic conditions in concrete structures shall be this Code and ASCE/SEI 41"? This is as clear as mud. ASCE/SEI 41 does not use the term "potentially hazardous" or "potentially dangerous" in any of its provisions. And there are no criteria or procedures provided to take the results of an ASCE 41 analysis and figure out if they meet the definition of potentially hazardous conditions (whatever those are) associated with Structural Performance Level, Collapse Prevention.	See response to 154
75.	Gwenyth R. Searer. S.E.	22	33-52	Since 4.4.4.1 indicates that the user need only consider seismic demands and seismic upgrade if the structure is damaged by earthquake, please add an exception (or similar) to 4.4.4 where the reference to "ASCE/SEI 41 for seismic design provisions" is referenced. Something like "where substantial structural damage was caused by earthquake" so it reads "supplemented by this Code for the existing structure and, where substantial structural damage was caused by earthquake, ASCE/SEI 41 for seismic design provisions" in Line 34-35	***Persuasive. See revised text below:*** **R4.4.4** Supplemental requirements of this Code for the design-basis criteria include strength reduction factors in accordance with 5.3 or 5.4, capacities according to Chapter 6, repairs in accordance with Chapter 7, durability in accordance with Chapter 8, repair construction in accordance with Chapter 9, and quality assurance in accordance with Chapter 10. ~~The referenced seismic design provisions of ASCE/SEI 41 are adapted from those defined in the IEBC.~~
76.	Gwenyth R. Searer. S.E.	22	44-45	What does "The referenced seismic design provisions of ASCE/SEI 41 are adapted from those defined in the IEBC" mean? Nothing in 4.4.4 defines any such adaptation.	***Persuasive.*** **R4.4.4** Supplemental requirements of this Code for the design-basis criteria include strength reduction factors in

					accordance with 5.3 or 5.4, capacities according to Chapter 6, repairs in accordance with Chapter 7, durability in accordance with Chapter 8, repair construction in accordance with Chapter 9, and quality assurance in accordance with Chapter 10. ~~The referenced seismic design provisions of ASCE/SEI 41 are adapted from those defined in the IEBC.~~
77.	Gwenyth R. Searer. S.E.	28	5-9	I don't think this is clear. If I drop extraneous phrases, I get the following: "…building code load demands or capacities for any lateral-force-resisting … structure of the work area"? What is a lateral-force-resisting structure of the work area?	***Persuasive*** See response to 148.
78.	Gwenyth R. Searer. S.E.	28	29-32	"rehabilitated" is the wrong word. Recommend "strengthened" in all three locations.	***Persuasive*** See suggested changes below; **4.9.2** For the existing elements of the work area if demand based on the current building code is greater than the demand on those elements based on the original building code, the affected elements shall be ~~rehabilitated~~ strengthened using the current building code demands and the capacities based on this Code, and the lateral-force-resisting system shall be evaluated and ~~rehabilitated~~ strengthened if necessary to meet the Basic Performance Objective for Existing Buildings, as defined in ASCE/SEI 41. New concrete members and connections to existing construction ~~that are part of the rehabilitation~~ shall be in accordance with 4.2.3.
79.	Gwenyth R. Searer. S.E.	All	All	See prior comment for overarching comment that applies to all sections where the term "rehabilitation" is used.	***Non-Persuasive.*** The title cannot be changed. The proposed change of the title to Rehabilitation does not reflect the fact that a common outcome of any assessment is a decision that no repairs are required. Therefore, assessment is required in the title as the code requirements apply to assessment, repair and rehabilitation of existing structures.

80.	Gwenyth R. Searer. S.E.	22-23	33-3	Both 4.4.4.1 and 4.4.4.2 are exceptions to 4.4.4. They need to be structured as such. Section 4.4.4 invokes all loads in the current building code. This includes wind, snow, dead, live, seismic, flood, tsunami, rain, etc. But 4.4.4.1 only requires seismic to be considered if the substantial structural damage was caused by earthquake. And 4.4.4.2 only requires load combinations that include gravity loads and wind loads if the damage was caused by wind. In which cases, these are exceptions to 4.4.4. They should be moved up under 4.4.4 and listed as exceptions.	***Non-Persuasive*** ACI stylistically does not use the term exception.
81.	Gwenyth R. Searer. S.E.	3	44-45	The definition of "licensed design professional" should be in the definitions section.	***Non-Persuasive.*** This term is already defined in Chapter 2. Term has been italicized. **1.2.3** The *licensed design professional* is responsible for the assessment or repair and rehabilitation design, or both.
82.	Gwenyth R. Searer. S.E.	4	41-42	The phase "or portion(s) of the code" needs to be added between "…refers to the code" and "adopted by the authority…". Older editions of the International Building Code (IBC) have provisions governing existing buildings in Chapter 34. Further, provisions governing existing buildings (like re-roofing, and in-situ load testing, among others) are still contained within the IBC. ACI 562 needs to recognize that. Corrected, the provision will read: "The 'existing building code' refers to the code or portion(s) of the code adopted by the authority having jurisdiction that regulates existing buildings or structures."	***Non-Persuasive*** The AHJ of a city adopts something and it is the code of that city. The pieces adopted form the code.
83.	Gwenyth R. Searer. S.E.	5	45-46	This commentary sentence is a non sequitur that really has nothing to do with the code provision it purports to explain. Lines 47-48 are much better and actually speak to the code provision. Please delete 45-46.	***Non-persuasive*** the commentary is somewhat related to the section. Consider review in next update cycle.
84.	David P. Gustafson	7	6, 8	In Line 6 (two places) and in Line 8 (two places), replace "work" with "Work".	***Non-persuasive*** there does not appear to be a pattern of caps used for this term or other similar terms.
85.	Gwenyth R. Searer. S.E.	7	37	Chapter 27 of ACI 318 covers strength evaluation of existing structures. You should at least mention ACI 318, since ACI 437R is just a report and is not adopted by any jurisdictions as far as I know.	***Non-persuasive.*** *No change – Chapter 27 of ACI 318 references the same document, as it provides context on load testing.*

					Section is commentary, so adoption is not a criteria citing as a reference.
86.	David P. Gustafson	8	26	The term "seismic-force-resisting system" occurs in Line 26, in Lines 29-30, and in Line 32. But the term "lateral-force-resisting system" then appears in Lines 37 and 39. Why the change in terminology "lateral" versus "seismic"? A similar change in terminology occurs on Page 11.	***Non-persuasive*** seismic design is not required in SDC A, making lateral force-resisting system the more appropriate term.
87.	David P. Gustafson	8	49	Consider replacing "seismic resistance" with "earthquake resistance".	***Non-persuasive*** "seismic" is systematically used.
88.	Gwenyth R. Searer. S.E.	9	4-5	Section 1.7.6.1 is really an exception to 1.7.6. It needs to be labeled as an Exception. Otherwise, 1.7.6.1 is in direct conflict with 1.7.6.	***Non-Persuasive*** *No change – The text is not an exception, and is not in conflict. It is a clarification of the type of strengthening that may be permitted. ACI stylistically does not do exceptions.*
89.	Gwenyth R. Searer. S.E.	9	14-15	Section 1.7.7.1 is really an exception to 1.7.7, it needs to be labeled as an Exception. Otherwise, 1.7.7.1 is in direct conflict with 1.7.7.	***Non-Persuasive*** *No change – The text is not an exception, and is not in conflict. It is a clarification of the type of strengthening that may be permitted. ACI stylistically does not do exceptions.*
90.	David P. Gustafson	9	18	Replace "work" with "Work".	***Non-persuasive*** no precedent to capitalize. See #27.
91.	David P. Gustafson	11	29	Should "lateral-force-resisting system" be replaced with "seismic-force-resisting system"?	***Non-persuasive*** see response to #39.
92.	Gwenyth R. Searer. S.E.	11	48	This requirement is essentially a tautology or a circular reference. The requirement references the "design-basis code" but the definition of the "design-basis code" is the "legally adopted code requirements under which the assessments, repairs, and rehabilitations are designed and constructed." So when that definition is substituted into this section, it reads "Design of new elements shall be in accordance with the legally adopted code requirements under which the assessments, repairs, and rehabilitations are designed and constructed." Or, more succinctly, "Design of new elements shall be in accordance with the legally adopted code requirements under which the repairs are designed." I am unclear how this is helpful. I am not even sure if you are trying to say that the new	***Non-persuasive*** it is the intent of the Code that the design basis code be established as one of a) the existing building code, b) the original building code or c) the current building code.

				elements must be in accordance with the current building code for new construction or something else. If you are in this section, there is no existing building code, so what else could you be referring to other than the current building code for new construction?	
93.	Gwenyth R. Searer. S.E.	14 (15)	6-8	The terms "substrate" and "system material" should be defined. I would have thought that the concrete was both the "system material" (i.e., the material that makes up the structural system) and the "substrate", but this provision seems to indicate that they are different. Also, the way it is worded, you have forces going only one way in the definition: from the substrate to the system material, but presumably forces can go both ways?	***Non-persuasive*** Committee feels definitions are correct and clear as written
94.	Gwenyth R. Searer. S.E.	17	33-36	With respect, the proposed commentary makes no sense. It says that the definition of "repair is specific for repair of materials, components, or elements of existing concrete structures *if structural repair or durability is addressed*". What does that mean? There is already a proposed defined term called "repair, structural" and the definition of "repair" does not include any limit to just structural repairs.	***Persuasive editorial.*** **repair**—the reconstruction or renewal of concrete parts of an existing structure for the purpose of its maintenance or to correct deterioration, damage, or faulty construction of members or systems of a structure. **Commentary:** The definition is adapted from the IEBC and is specific for repair of materials, components, or elements of existing concrete structures ~~if structural repair or durability is addresses~~. Faulty materials, components, or elements of a structure are considered to be faulty construction resulting from errors or omissions in design or construction.
95.	David P. Gustafson	17	16	Replace "seismic events" with "earthquakes".	***Non-persuasive*** "seismic" is consistently used.
96.	Gwenyth R. Searer. S.E.	17	24	The definition of the term and use of the term "rehabilitation" should be stricken from ACI 562. As stated previously, the IEBC barely uses the word, and it doesn't use it in a meaningful way. In the IEBC, actions on a building are either 1) repairs, 2) additions, or 3) alterations. Those are the only categories into which work can be put. So if you are repairing damage, that is a repair. If you are building an addition, either horizontal or vertical, that is an addition. Everything else is an alteration. ACI's decision to add other categories like "rehabilitation" and "retrofit" and "strengthening" merely makes everything more complicated and makes it difficult for ACI to credibly claim that	***Non-persuasive.*** No change is required. The term rehabilitation is a general term, which is commonly used to describe some types of programs to improve the performance, or durability of a structure. No change is needed. Future Work - verify consistent language regarding repair and rehabilitation throughout the text.

				this code can be used in conjunction with the IEBC. This proposed definition of "rehabilitation" includes "repair", yet the phrase "repair or rehabilitation" occurs at least seven other places in this code, and the term "repair and rehabilitation" occurs in even more locations. This makes no sense. Either a repair is a subset of rehabilitation or it is not. Further, the proposed definition includes the phrase "to a desired useful condition." This is an anodyne statement that really doesn't mean much at all. If the term "rehabilitation" is kept as is, then all references to "repair and rehabilitation" need to be replaced with just "rehabilitation". Similarly, all references in 562 to "repair OR rehabilitation" within ACI may conflict with each other or be logically inconsistent and need to be corrected.	
97.	Gwenyth R. Searer. S.E.	18	19-22	This definition is very awkward and appears to conflict with itself. The work area consists of all areas indicated in the construction documents, correct? But it also includes "portions of the structure where work not initially intended by the owner is required…"? What does that mean? This implies that there is work being done that is not in the construction documents. How is someone (e.g., a building official) supposed to know what work was "initially intended by the owner"? Also, why does the "work area" include all areas that are assessed? What if an engineer assesses a very large portion of the structure but finds that the actual require repairs are limited to a very small area? Why would the work area include areas that don't include any repair work? Granted, this definition appears to have been initially based on the IEBC definition, but it takes a bad definition and makes it worse by adding nonsensical requirements. Recommend that you just stick to the bad definition in the IEBC. Note that the IEBC is using the term in a completely different way than ACI is using it here. This will lead to confusion.	***Non-persuasive.*** The definitions from 562 and IEBC are below for comparison. **work area**—that portion or portions of a structure consisting of all areas indicated in the construction documents or identified by the owner and licensed design professional for assessment; it excludes portions of the structure where incidental work entailed by the intended work must be performed and portions of the structure where work not initially intended by the owner is required by this Code. IEBC definition is below **WORK AREA.** That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code.

					The limitation of the work area to the area assessed is intended to protect the design professional by limiting the area they are responsible for, and not having them responsible for non-examined areas. The IEBC definition works when a project entails actual repairs, but is not sufficient when the project ends at after the assessment.
98.	David P. Gustafson	19	40-41	Consider replacing "seismic conditions" with "earthquake conditions".	***Non-persuasive*** "seismic" is consistently used.
99.	Gwenyth R. Searer. S.E.	19	43-44	This section says that use of the current building code (i.e., for new construction) shall be permitted to be used as the design-basis code; however, the design-basis code is defined as the legally adopted code requirements under which the assessments, repairs, and rehabilitations are designed and constructed." But the user is only in this section if the jurisdiction does not have provisions that govern the repairs of existing buildings, right? So you are referencing a code that does not deal with existing buildings. At best, this wording is pretty confusing.	***Non-persuasive.*** The text is permitting the current building code to be used as the criteria under which the repairs are completed. The text is clear – no change is required.
100.	David P. Gustafson	19	39	Consider replacing "seismic resistance" with "earthquake resistance".	***Non-persuasive*** "seismic" is consistently used.
101.	Gwenyth R. Searer. S.E.	20	7	This reference to repairs conflicts with the definition of repairs since repairs do not include new members according to the definition of repair in ACI 562.	***Non-persuasive.*** the reconstruction or renewal of concrete parts of an existing structure can include new members. No change is required.
102.	David P. Gustafson	20	26	Consider replacing "seismic resistance" with "earthquake resistance".	***Non-persuasive*** "seismic" is consistently used.
103.	David P. Gustafson	20	50	Consider replacing "seismic forces" with "earthquake forces".	***Non-persuasive*** "seismic" is consistently used.
104.	Gwenyth R. Searer. S.E.	21	49-50	The wording of this is vague and may have unintended consequences. "If there is a reason for the licensed design professional to question the capacity"? Suppose an engineer looks at a structure and concludes by inspection that portions	***Non-persuasive.*** No change – the text is clear.

				of it have very low remaining capacity. There may be no "reason" for the engineer to "question" the capacity because they already know it is very low. Consequently, there is no requirement to determine if substantial damage is present.	
105.	David P. Gustafson	21	10	Consider replacing "seismic forces" with "earthquake forces".	***Non-persuasive*** "seismic" is consistently used.
106.	David P. Gustafson	21	34	Consider replacing "seismic resistance" with "earthquake resistance".	***Non-persuasive*** "seismic" is consistently used.
107.	David P. Gustafson	21	45	Consider replacing "seismic" with "earthquake".	***Non-persuasive*** "seismic" is consistently used.
108.	David P. Gustafson	21	38, 42, 43	Consider replacing "seismic conditions" with "earthquake conditions"	***Non-persuasive*** "seismic" is consistently used.
109.	Gwenyth R. Searer. S.E.	22	6-9	What happens if there are both shear walls AND columns that are part of the lateral force resisting system? Are you really supposed to pick one or the other and calculate whether substantial structural damage has occurred?	***Non-persuasive.*** No change is required. The text is clear.
110.	Gwenyth R. Searer. S.E.	22	33-35	Please provide language that explains to the user what "supplemented by requirements of this Code for the existing structure and ASCE/SEI 41 for seismic design provisions" means. Which requirements of this Code? I see it in the commentary, but it has to be provided in the actual provisions.	***Non-persuasive*** No change is needed – the commentary explains the intent.
111.	Gwenyth R. Searer. S.E.	23 and all	5-6	Why is this so complicated? Cannot you just say, "Where damage is less than substantial structural damage, repairs are permitted to be made to restore the structure to its original design?" If you are really concerned about designs that never complied with the original building code, then you could add "provided that the original design complied with the building code under which the structure was originally permitted." OR: "Where damage is less than substantial structural damage, repairs are permitted to restore the structure to compliance with the building code under which the structure was permitted? That being said, with respect, these repeated attempts to "reinvent the wheel" of code upgrade triggers are exhausting. I don't particularly like the IEBC triggers, but most of them are relatively clear. How you go about interpreting them and implementing them is often not clear to many engineers. ACI 562 should not keep trying to reinvent the wheel, trying write additional and more complicated evaluation and upgrade	***Non-persuasive*** No change

				triggers. Rather it should focus on how to implement the IEBC triggers and required repairs for concrete structures. THAT would be a service. But making new, more exotic triggers that are at least as poorly worded as the original 2003 IEBC is not helpful.	
112.	David P. Gustafson	25	45	Consider replacing "seismic resistance" with "earthquake resistance".	***Non-persuasive*** No change – seismic is used consistently.
113.	Gwenyth R. Searer. S.E.	28	5-9	Section 4.8.4.1 should be an exception to 4.8.4.	***Non-persuasive*** ACI stylistically does not use the term exception. The situation is also described in the commentary.
114.	Gwenyth R. Searer. S.E.	ALL	ALL	***2.1*** Overall comment: All conflicts and "differences" between IEBC and ACI 562 should be eliminated. If ACI wants to provide a guideline document that provides guidance regarding how to implement the provisions in the IEBC with respect to concrete structures, that would be fine. But making ACI 562 a document that conflicts extensively with the IEBC (as this version does) will make code interpretation and enforcement a nightmare and will worsen the upgrade triggers in the IEBC. ***2.2*** This code needs to use the same terminology in exactly the same way as the IEBC. Ideally, the standard should stop adding ill-defined terms such as "potentially dangerous" and "potentially dangerous structural condition" and "potentially hazardous". These terms are impossibly vague, are not helpful at all, and merely cloud the important issues. In the IEBC, actions on a building are either 1) repairs, 2) additions, or 3) alterations. Those are the only categories into which work can be put. So if you are repairing damage, that is a repair. If you are building an addition, either horizontal or vertical, that is an addition. Everything else is an alteration. ACI's decision to add other categories like "rehabilitation" and "retrofit" and "strengthening" merely makes everything more complicated and makes it difficult for ACI to credibly claim that this code can be used in conjunction with the IEBC. ***2.3*** Similarly, using terms like "rehabilitation" and "retrofit" and "strengthening" are not helpful. No one really knows what the	***2.1*** - ***No Action Required*** - because no specific change proposed. See responses to specific items that follow. ***2.2 - Future Work*** - the term potentially dangerous has been removed from Section 1.7 so as to not conflict with use in combination with IEBC. It has not yet been removed from Section 1.8 or Chapter 4 which will be used when the IEBC is not adopted. Treatment of this term in 1.8 and chapter 4 should be considered in the next update. The IEBC (see clip below from 2021 IEBC) allows for variations in terminology.

				term “rehabilitate” means in the context of the IEBC, since it really doesn’t use the term in any meaningful way. And even this version of ACI 562 doesn’t seem to recognize that the term “rehabilitation” includes “repair” in its definition. The fact that the provisions keep referring to "repairs or rehabilitation” or “repairs and rehabilitation” as if they are completely different things is super confusing. But repairs are included in the definition of rehabilitation in this Code, so repairs are a type of rehabilitation as the terms are defined herein. ***2.4*** Even the attempts to mimic the IEBC triggers in Chapter Four are more difficult to understand than the provisions in the IEBC. ***2.5*** I urge you to make this standard only address the technical requirements (i.e., how to do it and not public policy requirements like upgrade triggers) once the IEBC has been used to determine what needs to be done (i.e., repairs, repairs and strengthening, additions, alterations, etc.). It would have been better to provide a draft of the entire document at once to aid in the review process. This is essentially the same comment that I provided regarding the last two editions. **2.6** Finally, I note that it was very difficult to review just three chapters out of the eleven or so chapters that comprise ACI 562. The context of these three chapters depends on the other chapters and vice versa.	**SECTION 201** **GENERAL** **201.1 Scope.** Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter. **201.2 Interchangeability.** Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular. **201.3 Terms defined in other codes.** Where terms are not defined in this code and are defined in the other International Codes, such terms shall have the meanings ascribed to them in those codes. **201.4 Terms not defined.** Where terms are not defined through the methods authorized by this chapter, such terms shall have ordinarily accepted meanings such as the context implies. Further the IEBC definitions are so vague as to be not useful. IEBC Definition of repair and alteration are below **[A] REPAIR.** The reconstruction, replacement or renewal of any part of an *existing building* for the purpose of its maintenance or to correct damage. **[A] ADDITION.** An extension or increase in floor area, number of stories, or height of a building or structure. **[A] ALTERATION.** Any construction or renovation to an *existing structure* other than a *repair* or *addition*. **[A] EXISTING BUILDING.** A building erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued. **[A] EXISTING STRUCTURE.** A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued. The definition of repair is to correct damage, but damage is not defined in the IEBC. That makes the definition of repair very flexible – anything can be a repair. the definition of existing building as for some reason, a building permit makes a structure existing. A permit legally allows you to build something, it does

					not make it existing. ***2.3 Non-Persuasive*** - A common outcome of any assessment is a decision that no repairs are required. Therefore, assessment is required in the title as the code requirements apply to an assessment and repair and rehabilitation ***2.4 - Future Work*** similar to #2.2***.*** ***2.5 - Non-persuasive.*** The committee has selected to instead have Section 1.7 provide a path for use with the IEBC and Section 1.8 provide a path for use without the IEBC. ***2.6 No Action Required***. Comment is noted.
115.	Gwenyth R. Searer. S.E.	4	41-42	The definition of "existing building code" should be in the definitions section.	***Future Work -*** committee will work on developing definition to be added to Chapter 2. Committee will also review consistency with use of italics for terms. One potential proposed definition: Code adopted by the authority having jurisdiction that regulates existing buildings or structures.
116.	Gwenyth R. Searer. S.E.	4	47-48	The definition of "original building code" should be in the definitions section.	***Future business -*** see response to #12
117.	Gwenyth R. Searer. S.E.	5	27-29	The term "general building code" is undefined and unclear. Do you mean "model building code"? If so, the sentence really isn't true or sensical since a model code is a model code and is not based on another code (such as the IBC). The third sentence in the paragraph _does_ make sense if you replace "general" with "model". Overall, this paragraph is unclear and needs to be edited to make it clear.	***Future business -*** refer to #12.
118.	Gwenyth R. Searer. S.E.	5	9-10	The definition of "current building code" should be in the definitions section.	***Future business -*** refer to #12.
119.	Gwenyth R. Searer. S.E.	7	1-3	I don't think what you are describing is generally a thing. I don't ever remember seeing an "instruction manual" from a licensed design professional or a contractor" for a concrete	***Future Work*** the language appears to suggest a standard of practice inconsistent with current practice, potentially creating liability risks for engineers using this standard. Suggest striking

				structure or for the repair or alteration of a concrete structure. (Nor is one needed.) Sure, I have seen instruction manuals for equipment or something like that, but not for a repair. I have also never seen an instruction manual provided by a concrete repair material manufacturer, other than the installation instructions. But installation instructions are not a manual, and they don't really cover anything other than surface prep, installation techniques, and curing requirements. I guess they might say something like "don't expose this product to chlorides" or something like that, but that's not an instruction manual either. This section should be deleted.	the whole sentence.
120.	Gwenyth R. Searer. S.E.	8	43-45	Add the word "substantive" between "result in a" and "change". Any repair, no matter how small will change the strength, stiffness, or ductility of the seismic-force-resisting system. If I install a structural repair mortar with a slightly different modulus of elasticity than the original concrete or if I repair a column and add in reinforcing steel and put in the tiniest bit more steel than was originally there, I have changed the stiffness or strength of the system. What you should be concerned about is SUBSTANTIVE changes to the strength, stiffness, or ductility. Yes, this requires judgment. But your current wording permits no judgment, no common sense.	***Future Work*** it is recognized that a trigger is needed but the committee has not yet been able to agree on what the trigger should be.
121.	Gwenyth R. Searer. S.E.	8	26-27	Add the word "substantively" between "do not" and "change". Any repair, no matter how small will change the strength, stiffness, or ductility of the seismic-force-resisting system if the repair involves any part of the lateral-force-resisting system. If I install a structural repair mortar with a slightly different modulus of elasticity than the original concrete or if I repair a column and add in reinforcing steel and put in the tiniest bit more steel than was originally there, I have changed the stiffness or strength of the system. What you should be concerned about is SUBSTANTIVE changes to the strength, stiffness, or ductility. Yes, this requires judgment. But your current wording permits no judgment, no common sense.	***Future Work*** see response to #33.
122.	Gwenyth R. Searer. S.E.	8	39	Add the word "substantive" between "result in a" and "change". Any repair, no matter how small will change the strength, stiffness, or ductility of the seismic-force-resisting system. If I install a structural repair mortar with a slightly different modulus of elasticity than the original concrete or if I repair a column and add in reinforcing steel and put in the	***Future Work*** see response to #33.

				tiniest bit more steel than was originally there, I have changed the stiffness or strength of the system. What you should be concerned about is SUBSTANTIVE changes to the strength, stiffness, or ductility. Yes, this requires judgment. But your current wording permits no judgment, no common sense.	
123.	Gwenyth R. Searer. S.E.	10	22-26	The term "potentially dangerous" is bad code-writing. Potentially is completely subjective and could mean anything to anyone. More comments are provided regarding this further down. For now, delete the "potentially" from both of these provisions.	***Future Work*** the committee has had some discussion but not come to resolution regarding potential changes to this term.
124.	Gwenyth R. Searer. S.E.	11	35-37	Add the word "substantive" between "result in a" and "change". Any repair, no matter how small will change the strength, stiffness, or ductility of the seismic-force-resisting system. If I install a structural repair mortar with a slightly different modulus of elasticity than the original concrete or if I repair a column and add in reinforcing steel and put in the tiniest bit more steel than was originally there, I have changed the stiffness or strength of the system. What you should be concerned about is SUBSTANTIVE changes to the strength, stiffness, or ductility. Yes, this requires judgment. But your current wording permits no judgment, no common sense.	***Future Work*** see #33.
125.	Gwenyth R. Searer. S.E.	11	18-19	Add the word "substantively" between "do not" and "change". Any repair, no matter how small will change the strength, stiffness, or ductility of the seismic-force-resisting system. If I install a structural repair mortar with a slightly different modulus of elasticity than the original concrete or if I repair a column and add in reinforcing steel and put in the tiniest bit more steel than was originally there, I have changed the stiffness or strength of the system. What you should be concerned about is SUBSTANTIVE changes to the strength, stiffness, or ductility. Yes, this requires judgment. But your current wording permits no judgment, no common sense.	***Future Work*** see #33.
126.	Gwenyth R. Searer. S.E.	11	55	This is a great example of the problems that can be caused by using different terms with extremely vague definitions that may or may not be interchangeable. Section 1.8.6.3 prevents the user from repairing or "rehabilitating" elements of the seismic force resisting system. And Section 1.8.7 prevents the user from "retrofit" of elements of the seismic force resisting system (unless you go to ASCE 41). But if you call it "strengthening", you can do it according Section 1.8.9. With	***Future Work*** I do not see this as a conflict. A member may be strengthened voluntary subject to limits. Commentary can be added to clarify as part of future work.

				respect, this is a mess. I strongly recommend that you drop the terms "rehabilitation", which is largely incompatible with the IEBC, and "retrofit", which is also a pretty vague term, throughout ACI 562. Strengthening is a term that nearly everyone understands and is a much better term to be using.	
127.	Gwenyth R. Searer. S.E.	13	40-41	"Service loads" is not really a defined term. The IEBC no longer uses this term for this reason. You need to define it.	***Future Work*** **-** committee will look at developing consistent terminology
128.	Gwenyth R. Searer. S.E.	13	49-50	This definition seems vague. By "external reinforcement" do you mean FRP around a column? Or do you mean external shoring or bracing? Or do you mean steel reinforcement that is not encased in concrete (e.g., jacketing a column with steel, or adding a kingpost and external post-tensioning to a beam or slab to increase strength? This definition seems unclear.	***Future Work - See Chapter 5.*** This is addressed in Chapter 5 and a reference on probable material properties is provided in the commentary.
129.	Gwenyth R. Searer. S.E.	13	21	What does "service load capacity" mean? You mention "allowable stresses according to the original building code." Do you mean "allowable load"? if so, you either need to define "service load capacity" or replace it with "allowable load" and change it throughout the code.	***Future Work*** This is addressed in Chapter 4.
130.	Gwenyth R. Searer. S.E.	14 (15)	42-43	What is a "physical attack imposed on a material"? I have never heard of demand being defined in this way. Please provide a definition of "physical attack".	***Future Work.*** Committee will work on further clarification.
131.	Gwenyth R. Searer. S.E.	15	50	The term "extreme event" is not defined. If you are going to base a judgment on whether something performed well and was able to reach its design service life, then the threshold at which an event need not be considered should be defined. As stated previously, many design loads are or could be considered to be extreme events. Is "extreme event" the same thing as an "extraordinary event" as used previously? Please provide a definition of "extreme event".	***Future Work*** **-** committee to work on potentially developing definition of extreme event?
132.	Gwenyth R. Searer. S.E.	17 and all	12-17 and all	This definition is badly flawed. The term itself includes the word "potentially", which is impossibly vague, since all things may potentially be true, and pretty much all things are possible. Further, the word "potential" and the word "potentially" occur in the definition, so it is essentially a cyclical definition.	***Future Work*** See previous comments.

				The definition of dangerous already includes things that may collapse, detach, or dislodge, so there is no need to add "potential of collapse of overhead components"; plus, "potential" is one of the worst possible words to include in a technical definition. The proposed definition includes the word "unsafe" and grammatically refers to "the definition… of unsafe", but there is no definition in this code for "unsafe". What does "unsafe" mean in the context of a concrete repair code? The idea of "potentially hazardous resistance for seismic events" is poor language to begin with because "potentially hazardous" modifies "resistance", but what you seem to be talking about is where a structure has insufficient ductility or strength to withstand an earthquake of a given intensity. I can kind of guess what you mean, but the term "potentially hazardous resistance" is not well worded. Plus, according to ASCE 7, even brand new buildings, designed and built according to current code apparently have a 10-percent chance of posing a life-safety hazard in the event of a design-level earthquake. So pretty much every building has "potentially hazardous resistance for seismic events". Similarly, the term "a limit state of unacceptably low margin of safety against collapse" is vague and open to pretty much any interpretation. Unacceptable to whom? Under what loads? I am not sure why "limit state" is even mentioned since this is the definition of "potentially dangerous". Presumably the structure wouldn't even have to reach a limit state before anyone could deem it to be potentially dangerous. Or are you trying to say that the structure must be in a severely damaged limit state such that it may collapse at any second? If that is the case, then the IEBC definition of dangerous already covers this possibility, and you can delete the second half of this definition. This definition can mean anything to anyone. I again strongly recommend that you delete this term and only use the term "dangerous" as it is defined in the current IEBC.	
133.	Gwenyth R. Searer. S.E.	17	9-11	The proposed wording of the definition of "owner" would also (improperly) include a property manager, but that is not an owner. Also, that portion of the definition would also not	***Future work*** **-** review definition of owner in ICC codes

				include owners who have not retained a contractor. Recommend striking the first portion of the definition so that it just reads "the party in legal possession of the structure." That is the owner.	
134.	Gwenyth R. Searer. S.E.	17	43-45	Increasing the ductility of a concrete member, such as confining a column with FRP is not a repair in the IEBC. It is an alteration. The commentary's position that repairs to nonstructural members whose failure would cause or result in potentially dangerous structural conditions are considered structural repairs" is also problematic for the following reasons: 1) the term "potentially dangerous structural conditions" is not defined. No one knows what that is. 2) the definition of "structural repair" is to restore a damaged or deteriorated structure to its original capacity (or increasing its capacity, which is wrong on many levels, but a different topic). There is no mention of repairs to nonstructural members. The commentary is not aligned with the definition it is attempting to explain.	***Future Work*** Disagree with first part of comment the IEBC definition of repair is open enough **[A] REPAIR.** The reconstruction, replacement or renewal of any part of an *existing building* for the purpose of its maintenance or to correct damage. Correcting damage can include a need for more ductility. For 2nd part of comment – suggest removing potentially. We can also use the IPMC term of imminent danger to modify. Will be looked at as future work.
135.	Gwenyth R. Searer. S.E.	17	30-31	The proposed definition of repair conflicts with that of the IEBC. The IEBC does not consider correction of faulty construction to be a repair. The IEBC simply defines repair as "the reconstruction, replacement, or renewal of any part of an existing building for the purposes of its maintenance or to correct damage." In this definition of "repair," ACI is proposing to strike "replacement" of a part or member of a building from the definition of repair and add in correction of faulty construction. This is a mistake that will create confusion. If I need to replace a concrete member as a result of damage, the IEBC would consider that to be a repair, but ACI 562 would inexplicably not. If I want to correct undamaged but faulty construction, the IEBC would consider that to be an alteration, but ACI 562 would consider that to be a repair. These deviations from and conflicts with the model code for existing buildings make no sense. If you truly intend to make ACI 562 compatible with the IEBC, then these conflicts need to be eliminated.	***Future Work***
136.	Gwenyth R.	17	38-39	The intent of this definition is unclear. Is the intent to say that	***Future Work***

	Searer. S.E.			the repair reinforcement is the reinforcement used in the repair? Or is the intent to say that repair reinforcement is that reinforcement used to supplement the original strength, durability, and/or confinement? It could be read either way. Please modify the definition so the intent is clear.	Review with repair design committee
137.	Gwenyth R. Searer. S.E.	17	40-41	This is another conflict with the IEBC. The IEBC only has three categories of work on a structure: repair, addition, and alteration. Restoring a damaged or deteriorated structure to its original capacity would be a repair. Increasing the capacity of a structure is an alteration. By conflating alterations and repairs, ACI 562 creates a conflict with the IEBC. If you truly intend to make ACI 562 compatible with the IEBC, then these conflicts need to be eliminated.	***Future Work***
138.	Gwenyth R. Searer. S.E.	18	15-16	How does temporary bracing differ from that of "shoring"? One term must subsume the other, correct? Or is the intent that shoring provides vertical support and temporary bracing provides lateral support? If so, suggest modifying both definitions to reflect that intention.	***Future Work*** Committee agrees – temporary bracing can be removed and added to definition of shoring will consider as future work.
139.	Gwenyth R. Searer. S.E.	19	11-15	The proposed commentary does not describe how this chapter applies to rehabilitation of a structure. It just talked about repairs. What is an "environmental structure"?	***Future Work*** No change is needed. Text is clear. Revised text for environmental structures **R4.1.1** The assessment and repair design criteria and associated demand-to-capacity ratios used in this Chapter were developed to be consistent with the performance-based procedures presented in 1.3.1.3 of ASCE/SEI 7-16. The licensed design professional for the project should evaluate the applicability of this Chapter to non-building structures (for example, environmental engineering structures such as those addressed in ACI 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary) as these structures may be designed with procedures that are not compatible with the performance-based procedures of ASCE/SEI 7.
140.	Gwenyth R. Searer. S.E.	21	34-38	Which versions of ASCE 7 and ASCE 41 are required to be used with this section?	***Future Work*** - Will be reviewed for consistency as part of editorial review by staff.
141.	Gwenyth R.	21	11-14	With respect, this commentary is not credible. The idea that a	***Future Work*** - Tsunami and flood have been added to the

	Searer. S.E.			single number (i.e., demand-to-capacity ratio ≥ 1.5) is somehow calibrated to all of the annual probabilities of failure and all of the associated reliability indexes for all of loads (except seismic), for all Risk Categories, and for all of the load combinations that do not include earthquake loads of Table 1.3-1 of ASCE 7-16 is simply not believable. It is even less credible when tsunami loads and extraordinary events are included (The commentary says that only earthquake loads were excluded). Lots of structures and lots of components are much more robust and much stronger than design codes give them credit for. It would be much more credible to say that "a demand-to-capacity ratio of 1.5 was arbitrarily selected as an approximate lower bound at which failure or collapse is likely occur."	exclusions. See response to 114. No change – the commentary is clear
142.	Gwenyth R. Searer. S.E.	21	30-31	The wording of this provision is unclear. "Structures without potentially dangerous structural conditions" and "demand-to-capacity ratio of 1.5 or less" are two requirements of this section. But if the demand-to-capacity ratio of any portion of the structure is greater than 1.5, it has already been defined as "potentially dangerous structural condition". So the second half of the charging language of this provision is superfluous and confusing. Delete "and if the demand-to-capacity ratio is 1.5 or less".	***Future Work*** They are distinct thoughts, but committee will work to add commentary.
143.	Gwenyth R. Searer. S.E.	23	28-35	If I am reading this right, this is a mess. You are comparing the original demands to the _damaged_ capacity of the member. Unless the member was substantially over-designed, this ratio will almost always be larger than 1. The whole point of the substantial structural damage trigger is to define when upgrades are required and when you can put it back the way it was. This provision seems to completely ignore that. Why wouldn't you compare the demand to capacity of the element once it has been repaired?? What is a strengthening repair? This term is not defined. It implies strengthening beyond what it was before the damage, but the commentary that follows seems to imply that the plain language meaning of the words is not correct. A definition of this term is required. If it means "Do not strengthen, just repair to the pre-damage condition" then it _definitely_ needs	***Future Work*** No change at this time. The section is addressing conditions with less than substantial structural damage. The intent of the provision is to compare current capacity, calculated using provisions of the original design code with the original demand. Last part – strengthening can be editorially deleted. **4.5.2** The demand-to-capacity ratio of the member, system, or structure of the work area shall be evaluated using the nominal loads, load combinations, and

				a definition.	capacities established by the original building code. ~~Strengthening r~~Repairs are required if the demand-to-capacity ratio exceeds 1.0, as given by Eq. (4.5.2).
144.	Gwenyth R. Searer. S.E.	27	41-43	I don't think this is clear. If I drop extraneous phrases, I get the following: "When the capacity of the … structure of the work area of the existing structure supporting gravity loads…" Does that make sense? This does not appear to be proper English to me. Can you simplify it or clarify it?	***Future Work*** **4.8.1** If alterations are made that change the gravity load demands on the member, system, or structure ~~of~~in the work area of the existing structure, the demand shall be determined for 1) The configuration prior to the alterations using the original building code loads and load combinations, and 2) The configuration with the alterations using the current building code loads and load combinations. **4.8.2** For the existing elements ~~of~~ in the work area required to support gravity loads of the alteration, if the gravity load demands of the current building code with the alterations are more than 5 percent greater than demands of the original building code without the alterations, the design-basis code criteria shall be the current building code, and this Code shall be used for the existing member, system, or structure within the work area. **4.8.3** When the capacity of the member, system, or structure ~~of~~ in the work area of the existing structure supporting gravity loads is to be reduced as part of the alteration, the reduced capacity shall not be less than the current building code demand.
145.	Gwenyth R. Searer. S.E.	27	25	The term "alteration" is not defined. Since ACI 652 uses terms that are in conflict with IEBC terms, using an IEBC term without defining it leaves it vague and unclear. I recognize that this portion is where there is no existing building code, but what is the definition of alteration?	***Future Work*** The term would need to be defined by the group adopting the code. Will be reviewed as future work.
146.	Gwenyth R.	27	28	What is "the structure of the work area of the existing	***Future Work***

	Searer. S.E.			structure"? This is unclear.	See response to 143 which made a change that clarifies this.
147.	Gwenyth R. Searer. S.E.	8	48-52	"Rehabilitation" is a bad word to use because its definition is very vague. Yes, the IEBC uses it a few times, but not in a meaningful way (they just define it as "any work… undertaken in an existing building"). It would be much better to say "strengthening" in Line 50 as opposed to "rehabilitation". Then it would match "strengthening" in Line 52.	***No Action Required*** per earlier comments by same reviewer, rehabilitation is to be consistently used.
148.	Gwenyth R. Searer. S.E.	9	12	Why is "existing building code" italicized here and nowhere else?	***No Action Required*** see responses above.
149.	Gwenyth R. Searer. S.E.	9	38	Why is "design-basis code" italicized?	***No Action Required*** because it is a defined term.
150.	Gwenyth R. Searer. S.E.	13	26-27	Where is "probable material properties" defined?	***See Chapter 5.*** This is addressed in Chapter 5 and a reference on probable material properties is provided in the commentary.
151.	Gwenyth R. Searer. S.E.	13	26-27	The mention of "extraordinary event" is confusing. It is defined in the definition as "low-probability", but most design loads are pretty low probability. The design-level earthquake happens once every 1000 years or so. The design-level wind, once every 700 years. Some roofs never see their full design live load… This definition needs work, but I don't know what you intended.	***See Chapter 5.*** This is addressed in Chapter 5