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**Meeting Agenda for
TAC Repair and Rehabilitation Committee
Tuesday, October 16, 2007, 9:00 AM - 12:00 PM
ICACO A
El Conquistador Resort & Spa
1000 Conquistador Avenue, Fajardo, Puerto Rico**

Members

James McDonald (Chair)

Miroslav Vejvoda (Secretary, NV)

Paul Carter

Peter Emmons

Paul Gaudette

Fred Goodwin

Lawrence Kahn

Antonio Nanni

Kelly Page

Jay Paul

Michael Sprinkel

1.0 Welcome

2.0 Introduction (McDonald)

3.0 Approval of the Meeting Minutes from Atlanta, April 24, 2007

ACTION: Does TRRC approve the minutes from Atlanta?

4.0 Approval of Agenda

ACTION: Does TRRC have additional items for the Agenda of this meeting?

5.0 TRRC Interim Meeting (Emmons)

A TRRC Interim meeting took place on July 25, 2007 in Baltimore. In addition to TRRC members, several other people were invited to discuss repair-related specifications. The meeting notes have been posted on the TRRC website and are attached (See Exhibit 5.0).

ACTION: 1) Peter Emmons is asked to report.
2) Does TRRC approve the meeting notes?



6.0 Repair Code (Kahn)

In Atlanta, Chair Kahn reported that ACI Committee 562 now has 24 voting members. There were unofficial subcommittee meetings in Atlanta and a main committee meeting to review the progress on different chapters. Similar meetings are planned for Puerto Rico.

TAC reviewed an outline of the repair code at its 2007 summer meeting and provided comments to committee 562.

ACTION: Chair Kahn is asked to update TRRC on progress to date.

7.0 Repair Specification

At its 2007 summer meeting, TAC approved the establishment of a new committee 563, Specifications for Repair of Structural Concrete in Buildings. TAC named Tony Murray as chair.

The committee has scheduled the first meeting at the Puerto Rico convention, on Tuesday, October 16, 2007, 1:30 to 4:30 pm. The committee currently consists of 14 voting members and 1 associate member.

ACTION: No action is required.

8.0 Repair/Protection Council (Page)

On March 15, 2007, the council met in Chicago to update the Vision 2020 goals, to discuss sponsoring organizations' relationships, and to address fund raising efforts. A meeting was also held on this date to discuss development of repair related specifications.

No other meetings took place.

ACTION: Chair Page is asked to update TRRC on recent and near-term activities of the Council.

9.0 SDC Meetings (Emmons)

SDC met in San Diego, CA, on September 24-25, 2007.

ACTION: Peter Emmons is asked to report on any repair-related activities.



10.0 Implementation of the TRRC Action Plan (McDonald)

TRRC members previously reviewed designated committees' documents in detail to determine what repair-related areas of those documents need to be addressed according to the TRRC action plan.

McDonald	201, 207, 210, 221, 346, 423, 446
Carter	506, 342, 365, 304, 357, 439, 524
Emmons	229, 230, 330, 332, 371, 533
Gaudette	303, 336, 363, 362, 372, 546
Goodwin	216, 225, 311, 351, 355, 364, 543
Kahn	301, 313, 341, 350, 363, 530
Nanni	360, 373, 437, 440, 544, 549
Page	116, 212, 232, 234, 303, 309, 547
Paul	222, 302, 315, 343, 349, 515
Poston	224, 228, 318, 352, 408, 550
Sprinkel	325, 345, 503, 504, 548, 551

TRRC submitted the recommendations to TAC after the Atlanta meeting. (See Exhibit 10.0 for the recommendations.)

At its 2007 summer meeting, TAC asked that TRRC continue to work with the technical committees on an informal basis.

ACTION: Assignment will be made to ensure that committees are aware of TRRC objectives.

11.0 ISO/TC/SC7 (Goodwin)

Substituting for Jim McDonald, Fred Goodwin was the US lead delegate at the ISO/TC71/SC7 meeting held May 2007 in Brazil. The objective of this group is to develop an umbrella code for maintenance and repair of concrete structures.

ACTION: Goodwin is asked to update TRRC on current ISO activities.



12.0 Future Plans

What should be the future direction for TRRC in ACI repair related activities? Is there a continuing need for this TAC subcommittee? Members should be prepared to discuss their thoughts on future directions and activities for TRRC.

13.0 Next TRRC Meeting

14.0 Adjourn

Exhibits: 5.0 – TRRC Interim Meeting Notes
10.0 – TRRC Recommendations to TAC



Exhibit 5.0 – TRRC Interim Meeting Notes

TRRC Interim Meeting Baltimore, MD July 25, 2007 Meeting Notes

TRRC Members attending:

Peter Emmons
Paul Gaudette
Fred Goodwin
Larry Kahn
Kelly Page
Jay Paul
Miroslav Vejvoda, Secretary (NV)

TRRC Members not attending:

Jim McDonald, Chair
Paul Carter
Antonio Nanni
Michael Sprinkel

Invited Nonmembers attending:

Rick Edelson
Tony Murray
David Rodler

Introduction

The meeting was called to order at 8:15 am. Chair McDonald had asked Peter Emmons to chair this meeting in his absence. All attendees introduced themselves. The meeting was adjourned at 2:00 pm.

1.0 Background

In response to the TRRC review of 2006 MCP and the resulting recommendations to TAC, at its summer meeting in July 2007, TAC approved the formation of an ACI repair specifications committee. Tony Murray will chair this committee that will meet for the first time at the Puerto Rico convention. The goal is to appoint a small number of people to the committee to establish the repair specifications format and outline. Later on, more members



will be appointed to work on the specifications. This mandatory language specification will, most likely, be a reference specification. It will support the ACI 562 repair code in a similar way that ACI 301 supports ACI 318 building code.

ICRI specifications committee is working on a nonmandatory language guide specifications.

2.0 Meeting Objectives

It is desirable to establish the specifications that should be available for the industry in approximately 10 years. The type of specifications and the areas to be covered should be envisioned. It should also be determined which committee or organization should be producing those specifications.

3.0 Specifications

The ICRI guide specifications committee's chair David Rodler asked for assistance in establishing priorities for his committee. Most of the meeting time was spent discussing the subject and type of specifications the ICRI committee should be working on. So far, this committee of 20 members met twice and provided comments to a draft of a Top Surface Partial Depth Repairs document and commentary drafted by David. The draft is attached. It is difficult to determine the optimum amount of commentary. The commentary is very important as it should enable the specifier to make educated decisions before writing the project specifications.

The Master Format 2004 repair specifications table of contents was distributed and is attached. Division 3, concrete, includes 26 individual topics for possible guide specification. Topics from other divisions may also be included. It may be beneficial for marketing reasons to include several related topics in one publication. In the future, a web-based electronic database could allow for users to assemble the individual topics applicable to their project. An attempt was made to select the main topics that are perceived as the industries highest priorities; see section 4.0 Recommendations.

These nonmandatory language guide specifications may be in prescriptive and performance based format. The Vision 2020 goals include performance based specifications that would help the specifier identify prescriptive information for the field use.

The existing ACI committees operate bottom-up; the committees are free to write documents and specifications as long as they meet the requirements of the Technical Committee Manual (TCM). The implementation of Vision 2020 is a top-down effort, giving committees guidance as to what particular areas should be covered by what type of documents. This will require some coordination.



To outline which organization (ACI and ICRI) produces what specifications or documents may necessitate further agreements between the organizations. Any such agreements need to be drafted and executed by the officers of the organizations. TRRC is a subcommittee of TAC and can only make recommendations to TAC.

Fred Goodwin made a presentation on the European effort regarding repair specifications based on a book published by Elsevier. "Repair of Concrete Structures to EN 1504" is available for purchase at:

<http://www.amazon.com/Repair-Concrete-Structures-EN-1504/dp/0750662220>

Fred suggested to use EN 1504 as a guide in development of documents both as for what to include and what to omit; the EN 1504 standard is very comprehensive but also has some weaknesses such as not addressing cracking potential.

The ICRI nonmandatory guide specification will be reviewed by ICRI TAC. It may be desirable to have some review mechanism from ACI as well, although no such mechanism exists at the present time. ACI TAC cannot review non-ACI documents. Individual people may be asked to review as outside reviewers. It is envisioned that the completed ICRI document would be made available to the ACI repair specifications committee to transfer its parts from the nonmandatory into a mandatory language specification, as deemed appropriate.

Peter Emmons is planning a fundraising effort in August 2007 to support the Vision 2020 goals. The repair code and specifications are parts of these goals. ACI 562 Chair Larry Kahn will prepare a budget for the repair code committee's meetings between conventions that may be necessary starting next year in order to produce the code by 2012. The ICRI specifications committee will identify their needs for meetings or assistance with commentary or review of the documents.

4.0 Summary

The following summary is based on the informal discussions during this meeting and does not represent an official TRRC or TAC recommendations.

- ACI's new repair specifications committee that envisions a mandatory language reference specification as its goal fits well into the Vision 2020 effort.
- ICRI's envisioned role is to write nonmandatory language guide specifications that would eventually cover many different field-related repair topics. The proposed list of priorities is as follows:

Priority	Guide spec scope (2012 completion)
1	Structural slab repair (top side or full depth)
2	Balcony slab repair



- 3 Column repair
- 4 Beam repair
- 5 Slab soffit repair (underside partial depth)
- 6 Overlays (see ACI 548)
- 7 Slab replacement
- 8 Wall repair

- The Vision 2020 fundraising will assist the repair code and specifications committees of ACI and ICRI achieve their goals within the set times.
- Some additional agreements between the two organizations may be necessary to avoid overlap of activities. The diagram below is showing a draft of the interface:

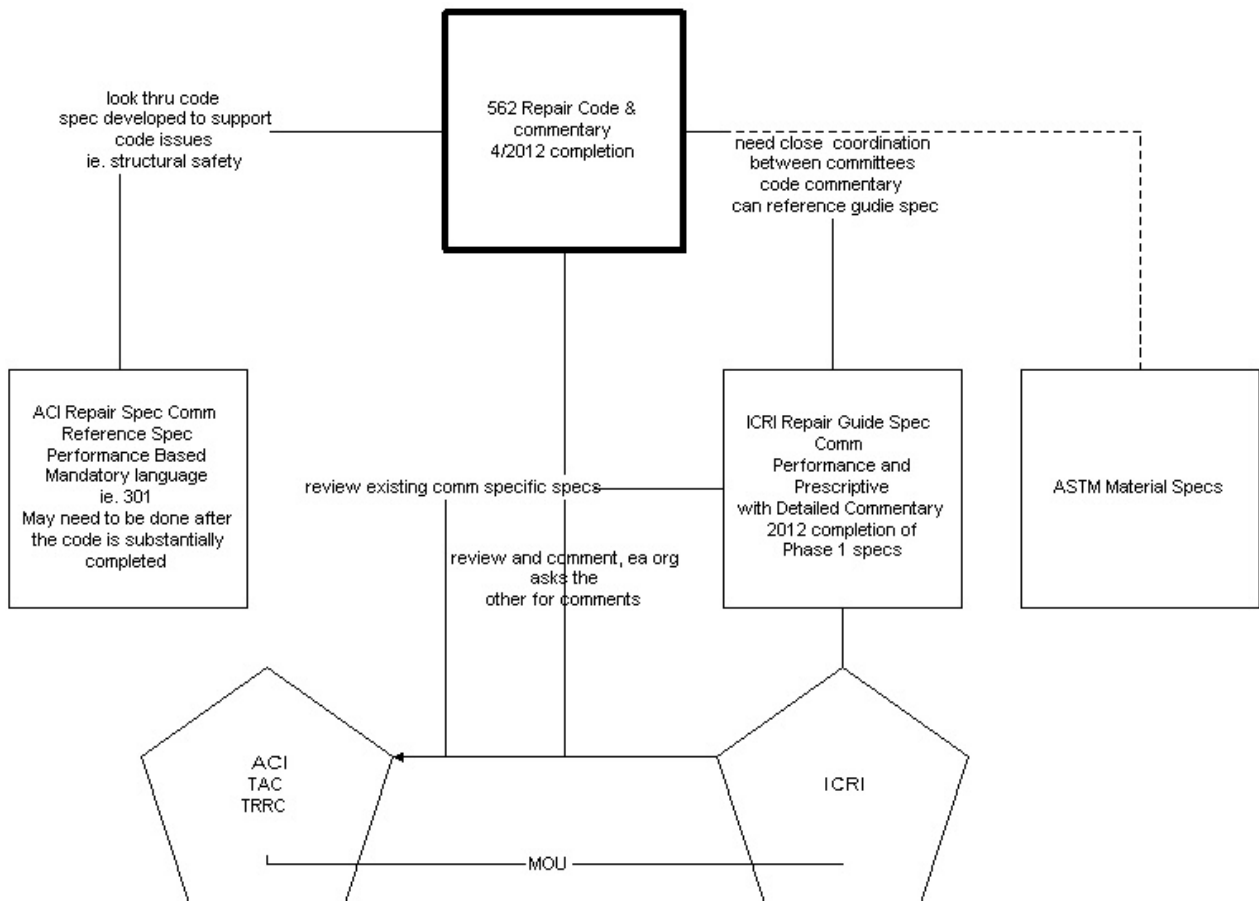




Exhibit 10.0 – TRRC Recommendations to TAC

TRRC - 2006 MCP Review			
Current ACI Document #	Document Name	Comments	Recommendations
116R-00	Cement and Concrete Terminology	There are many terms that should be included that are not - too numerous to mention, but as an example, this document does not include shotblasting, scarifiers, or hydrodemolition. Also, there are many definitions that do not match ICRI's <i>Concrete Repair Terminology</i> .	Repair-related terminology in 116R should be expanded significantly. TRRC recommends that 116R include repair terminology utilizing available ICRI and ASTM documents. ACI and ICRI staffs should explore the potential for a joint terminology document.
201.2R-01	Guide to Durable Concrete	Chapter 6 is a 2-page summary of concrete repair basics. All of the topics included in this summary are addressed in much greater detail in the ACI Concrete Repair Guide (546R-04). Similarly, the 2-page discussion of protective barrier systems to enhance concrete durability (Chapter 7) is very limited compared to the detail in ACI 546R-04. Both chapters appear to be outside the 201 mission to "develop and report information to ensure the production of durable concrete" and are unnecessary duplications of more comprehensive information in other ACI documents, particularly 546R-04.	Chapters 6 and 7 should be deleted from 201.2R-01 with references to 546R-04 as appropriate. The committee may miss the 2-year time limit to respond to TAC comments. <i>Note: A revised document without these two chapters was approved by TAC in Atlanta.</i>
204.3R-94	Practices for Evaluation of Concrete in Existing Massive Structures for Service Conditions	"repair" appears several times in this document generally in the context that structure evaluation is required to determine the need for repair, or the condition of any repairs should be included as part of inspection reports	No action



210.1R-94	Compendium of Case Histories on Repair of Erosion-Damaged Concrete in Hydraulic Structures	This compendium of case histories provides information on damage that has occurred to hydraulic structures and the various methods of repair that have been used. Summaries of repair techniques and subsequent performance are intended to aid in avoidance of oversights in design and construction of hydraulic structures and provide guidance in the treatment of future problems.	No action
210R-93	Erosion of Concrete in Hydraulic Structures	Approximately 3 pages (Chap 9) of the 24 page document are devoted to repair. Discussion is generally limited to the ability of a variety of materials to resist cavitation and abrasion erosion resulting from high velocity flow and waterborne debris. Material requirements and repair techniques for hydraulic structures are somewhat unique; therefore, this brief summary of pertinent considerations appears appropriate for this document. References are provided for additional details on each material and method.	No action
212.3R-04	Chemical Admixtures for Concrete	Repair only appears once in this document in the following paragraph: "Prepackaged mortar formulations are available that have an initial time of setting of 1 to 4 min and a final setting time of 3 to 10 min. They are used to seal leaks in below-grade structures, for patching, and for emergency repair. The ultimate strength of such mortar is much lower than if no accelerating admixture had been added."	No action needed, unless reference inserted to proper document detailing such mortars and their uses.
212.4R-04	Guide for the Use of High-Range Water-Reducing Admixtures (Superplasticizers) in Concrete	Repair only appears twice in this document: Once, in reference to low w/c ratio and how it can be beneficial to various grouts and prepackaged concretes used for repair and rehabilitation, and second, in reference to how having the proper mix can reduce the need to repair surface defects.	No action necessary



221.1R-98	State-of-the-Art Report on Alkali-Aggregate Reactivity	Repair of structures affected by AAR is briefly summarized in Chapter 11 (1-1/2 pages) with extensive references to other documents for details. AAR often requires unique techniques for maintenance and repair; therefore, Chapter 11 appears appropriate for this document. There is minimal overlap and no obvious conflicts with other ACI repair-related documents	No action
222.3R-03	Design and Construction Practices to Mitigate Corrosion of Reinforcement in Concrete Structures	The repair to defects of epoxy coated reinforcing is briefly discussed with reference to ACI 301. Appropriate reference is given to ACI 546 for repair methodology. This document correctly indicates that repair alone does little to address the causes of deterioration due to corrosion unless something is done to mitigate or stop the corrosion mechanism. This document provides guidance in this regard.	No change is required. It is an excellent supplement to ACI 546 and should be used as a reference when developing concrete repairs.
222R-01	Protection of Metals in Concrete Against Corrosion	This document discusses methods to control corrosion which is an important aspect of any concrete repair program. Procedures to identify corrosive environments and active corrosion are included in this document which must be considered in concrete repair programs. The document does discuss in general terms the methodology for repairs especially in Chapter 5 with reference to ACI 546.	Core document. This document is an excellent supplement to ACI 546 and should be used as a reference when developing concrete repairs. It emphasizes methods to control and prevent future corrosion. I do not think that there are any conflicts with 546 or that repair is covered too much but it should be carefully reviewed.
224.1R	Causes, Evaluation and Repair of Cracks in Concrete Structures	Document summarizes the causes, evaluation and repair of cracks.	Core document. This is a basic document that should be referenced by all committees for repair of cracks. It should remain with the committee, but be under the purview of TRRC.
224R	Control of Cracking in Concrete Structures	Document summarizes the mechanisms that cause cracking and methods that can be used in design and construction to mitigate cracking.	This is a basic document that should be referenced by all committees when discussing the cause of cracks. It should remain with the committee.



225R-99	Guide to the Selection and Use of Hydraulic Cements	No repairs are covered. Mention of the word "repair" is made in Section 2.2 describing some applications for special cements (T III, CA, MgPO ₄ , Ultrafine), Damage is used in section 6 regarding some of the deterioration mechanisms of cementitious materials.	Perhaps the descriptions of different cement types (section 2).might be useful as a reference in the Repair code. Also description of the physical and chemical parameters of cementitious materials would also be useful as a reference (sections 3, 4, 5, and 6).
228.2R	Nondestructive Test Methods for Evaluation of Concrete Structures	Document summarizes methods to evaluate the condition of existing concrete construction using various electro/mechanical/chemical methods.	Core document. This document should be within TRRC purview as it relates to evaluation of existing structures. ICRI will have a new document produced by the Evaluation Committee that will include a table of problems (delamination, etc.) and methods on how to evaluate them.
228.1R	In-place Methods to Estimate Concrete Strength	Document summarizes methods to estimate the strength of concrete. It addresses the issue for both new construction relative to form removal and issues when strength is in question in existing construction.	Leave the document with the committee.
229R-93	Controlled Low-Strength Materials	Two minor references to pavement repair.	No action.
230.1R-90	State-of-the-art Report on Soil Cement	Repair of slope protection not covered in existing repair documents	No action.
234R-96	Guide for the Use of Silica Fume in Concrete	"Repair" appears several times in this document generally in the context of how silica fume concrete has been used in repairs, because it provides things such as abrasion/erosion resistance, chemical attack resistance, etc. It also appears in the following section: "Research is needed to develop better test methods, to investigate the performance of concrete under field conditions, and to determine construction practices that produce the best results in terms of resistance to corrosion. A related issue of particular interest in North America is the repair of deteriorated structures. Research is needed to develop repair methods that will not simply create new corrosion cells in different locations. Silica-fume concrete may well have a role to play in these repairs."	No action needed on the general references to silica fume concrete being used in repairs. May want to remove "A related issue of particular interest in North America is the repair of deteriorated structures. Research is needed to develop repair methods that will not simply create new corrosion cells in different locations. Silica-fume concrete may well have a role to play in these repairs.", or update this with newer references. <i>Note: The above phrase does not appear in the 2007 MCP version of this document.</i>



301-05	Specifications for Structural concrete	See details below	See details below. Repair specification items are mixed in with 301 but should be separate. There should be a 301 repair subcommittee, a 562 repair specification, or a repair specification by another committee, possibly the ICRI Specification committee. The material selection guide should be used in developing the specification. TAC should decide how to create a repair specification.
301-05	Specifications for Structural concrete	Tests on hardened concrete in place (limited techniques)	Keep section 1.6.5 as is, reference repair spec when ready
301-05	Specifications for Structural concrete	Repair rejected concrete work by removing and replacing or by reinforcing with additional construction...by Architect/Engineer	Keep 1.7.1.3 & 4 as is
301-05	Specifications for Structural concrete	Action required when strength is potentially deficient. Section gives rehabilitation procedure.	This section needs to reference a repair specification
301-05	Specifications for Structural concrete	Action required when durability is potentially deficient	Keep until repair spec is ready.
301-05	Specifications for Structural concrete	repair of bar coatings -- epoxy repair prior to concrete placement	Keep as is
301-05	Specifications for Structural concrete	Repair of surface defects other than tie holes. Gives specific repair technique	Keep section 5.3.7.3 as is for now. Change language to "repair pursuant to specifications given in ACI 564 Repair Specifications". This really should reference ACI repair guide and ICRI guides.
301-05	Specifications for Structural concrete	Repair materials other than site-mixed portland cement mortar. Gives ASTM epoxy references	Needs to reference materials guide and application procedures
301-05	Specifications for Structural concrete	Repair of tie holes and surface defects (gives architectural finish requirements)	Keep 6.3.6 until an architectural repair spec is done



	Repair Specification	<p>Recommend: That TAC establish a subcommittee of ACI 301 (Specifications for Structural Concrete), ACI 546 or other appropriate committee, or create a new committee, to develop guide repair specifications. We understand that ICRI is currently beginning work on a repair specifications and this effort could also be coordinated. The current ACI 301 specifications dealing with repair are general and need to be consolidated into repair related guide specifications. We spoke with Calvin McCall, chair of ACI 301; he believes that 301 should deal with specifications directed at ACI 318, Building Code, and that 301 should not develop repair specifications. We further recommend that the following ACI personnel discuss this proposal: TAC chair, TRRC chair, 301 chair, 364 chair, 546 chair, and 562 chair. This discussion would help determine how ACI and ICRI should coordinate activities. The discussion would include the various committees' desires to participate in writing a Guide Specification or a Mandatory Specification. .</p>	<p>Reasons: The 562 "Repair Code" committee may want to reference specifications in its Standard. While the 562 commentary will reference items like the ACI Committee 546 Materials Selection Guide, many of the items mentioned in that Guide should be in a Specification format for use by repair designers and for direct reference by the 562 Code. It is requested that the specs follow the CSI numbering format. The Repair Code should reference an ACI or joint ACI-ICRI specification and should not reference just an ICRI document so that ACI TAC can assure coordination between the Code and Specification committees. We are recommending that a Guide Specification be written before a Mandatory Specification so that a document can be developed more quickly and can receive comments from practitioners before a final specification is drafted.</p> <p>The above recommendation will also hold true for ACI 303.1, Standard Specifications for Cast-In-Place Architectural Concrete.</p>
302.1R-04	Guide for Concrete Floor and Slab Construction	<p>Indicates that grinding, planing, removal and replacement can be used as remedial measures for slabs-on-grade. For suspended slabs, remedial measures are generally limited to grinding or use on an underlayment or topping material. No specific repair methods are given but the document indicates that the repair documents should clearly identify acceptable corrective methods. The document references ACI 222 and 222.1R for crack repairs. ACI 546 is not referenced.</p>	<p>No changes are required except that ACI 546 should be referenced.</p>
302.2R-06	Guide for Concrete Slabs to Receive Moisture-Sensitive	<p>Document has just been approved by TAC in Charlotte. ICRI considers mitigation of moisture in existing structures as the next step. Committee 302 does not seem interested in this effort.</p>	<p>Is this possibly a subject for committee 515?</p>



	Flooring Materials		
303.1-97	Standard Specification for Cast-in-Place Architectural Concrete	"Repair" appears several times in this document, in the context of surface defects that may need to be repaired.	As this is a specification, it does not get into how to repair the defects, so no action is necessary.
303.1-97	Standard Specification for Cast-in-Place Architectural Concrete	Repair is referred to generally regarding correction of aesthetic and casting problems such as contrasts, blemishes, etc. Mockups and matching for repair to the architectural concrete is also mentioned. There should be a reference to ACI 546R-04 for concrete repair. There is also mention of sealers and joint sealants which can be referenced to ACI 515.1R and AIC 504R.	References to ACI 515.1R and ACI 546R should be added. ACI 504 is out of date and needs to be assigned to another committee.
303R-04	Guide to Cast-in-Place Architectural Concrete Practice	Repair is discussed in relation to correcting construction problems. Section 2.5.4, par 4 should include a reference to ACI 546R. Emphasis on mockups throughout the document is good. Section 3.3 which discusses cracking should correspond with refer to greater detail in ACI 224. Section 3.4 Joints should correspond with and mention that ACI 504 has more detail.—Chapter 10 Finishing and Final Cleanup has several references to repair regarding blemishes, filling tie holes, etc. This chapter should correspond to recommendations of ACI 546R and ACI 515. Description of repair may be simplified or removed, and should refer to ACI 546 and 515 for more comprehensive information.	References to repair of blemishes and construction problems should reference ACI 546R, ACI 515. Chapter 10 needs some editing to correspond to ACI 546R and other repair documents and references to repair need to be added. ACI 504R is out of date and needs to be assigned to another committee. Issues are similar to 301. A new specification is needed to include the blemish issues, defects, acceptance of repair, reprofiling of surfaces with no anchorage to existing concrete, tolerances, etc. Some of these issues are not treated properly at present and there are legal issues. It is not always clear what is a repair issue (filling of bug holes, for example).



304.1R-92	Guide for the Use of Pre-placed Aggregate Concrete for Structural and Mass Concrete Applications	Mentions use in construction, but most examples are of repairs. PPAC is currently covered in 546 repair guide by referring to this 304 document.	Need 2 separate documents, construction with PPAC and repair with PPAC. The jurisdiction for the repair version of 304.1R should belong to 546. ACI 304 should focus on construction.
304.6R-91 (reapproved 1997)	Guide for the Use of Volumetric-Mixing and Continuous-Mixing Concrete Equipment	Chapter 1 mentions use in highway and bridge deck repairs	Probably best to leave this material in Committee 304 domain
304R-00	Guide for Measuring, Mixing, Transporting and Placing Concrete	Chapter 7, pp 20-24, covers the topic of PPAC. Underwater repairs are also mentioned.	Except chapter 7, jurisdiction for all other chapters can be left as is. Chapter 7, PPAC, refers to a repair method, generally not a construction method, so Chapter 7 should be moved to 546R repair guide, 546.2R underwater repairs, or to a new document, similar to 304.1R. Some overlap with 546; 304 should focus on construction that is the same for repair or new construction. Core document.
ACI 311.4R-05	Guide for Concrete Inspection	Sections 1.2, 1.3, 1.4, 1.5, 1.6, 2, 3, except for 3.3 and 3.6, Table 1 beginning with III, 3.7 with editing, 3.8, Appendix 1 section on preconstruction testing of materials parts 1-9, bag storage, and the section on post placement inspection depending on material and application method are relevant to a Repair Code.	Some minor changes are needed, but most of the document could be excerpted and dropped into the appropriate sections on repair. Edit and excerpt as needed, but should not be under the jurisdiction of the Repair Code as it mainly addresses new construction.
SP2	ACI Manual of Concrete Inspection	Chapter 11 Correction of defects in newly hardened concrete and repairs of older concrete, Chapter 12 the section on two course slabs, Chapter 14 sections on repairs and final acceptance, Chapter 15 sections on PPAC, US, and shotcrete, and Chapter 16 on pressure grouting and base plate grouting	Edit and excerpt appropriate sections.



315-99	Details and Detailing of Concrete Reinforcement	No specific concrete repairs are discussed except for the repair of damaged corrosion-resistant coatings on reinforcing.	No changes to this document are required.
330.1-03	Specification for Unreinforced Concrete Parking Lots	"Repair" is not included.	No action
330R-01	Guide for Design and Construction of Concrete Parking Lots	6.2—Surface sealing –in core documents 6.3—Joint and crack sealing- in core documents 6.4—Full-depth repair- not in core documents in the detail required 6.5—Undersealing and leveling- not in core documents 6.6—Overlay not in core documents in the detail required	Excerpt information from repair documents such as ACI 546 and reference as appropriate.
332R-84 (99)	Guide to Residential Cast-in-Place Concrete Construction	Chapter 11-Repair of surface defects, details methods of fixing new construction defects	These details are not covered in core repair documents, no action required
345R-91 (05)	Guide for Widening Highway Bridges	This document includes demolition, durability, and maintenance.	No action
345.2R-98 (05)	Routine Maintenance of Concrete Bridges	Bridges should be included within the purview of TRRC.	No action
346-01	Specification for Cast-in-Place Concrete Pipe	Very brief discussion of crack repairs	No action



349.3R-02	Evaluation of Existing Nuclear Safety-Related Concrete Structures	This document discusses methods to evaluate nuclear structures including testing techniques, evaluation criteria and acceptance criteria. Chapter 8 covers repair. No specific techniques are provided but 1999 Concrete Repair Manual is referenced indicating that there are methods cited that are well suited for nuclear power plants. ACI 546 is not specifically referenced. This chapter includes a brief discussion of selection criteria of a repair procedure, materials, required documentation, the qualifications of the craftsmen performing the work as well as other issues.	I think that Chapter 8 in this documents needs to be carefully reviewed for consistency with generally acceptable repair methods and procedures. This should be done by individuals with repair expertise in conjunction with representative of committee 349. An expertise with nuclear structures is essential. Mike Shield with Bechtel should be contacted. Repair issues for such structures are more severe as they are safety related.
351.1R-99	Grouting between Foundations and Bases for Support of Equipment and Machinery	No repairs are covered except for repair due to shim removal is briefly mentioned. No mention of the words "rehabilitation", "retrofit", or "restor*" in this document. "Damage" is mentioned in regards to freeze thaw action on freshly placed grout and the improved chemical resistance of epoxy grouts in situations where cementitious grouts would be damaged.	Since grouts are frequently used as repair materials or otherwise placed in contact with hardened concrete, this document should be referenced regarding the types, testing and construction practices of grouts. It is specifically written for the application of grouts for load transfer in equipment foundations, so little could be extracted for insertion into a Repair Code. A few section should be in the repair code.
351.3R-04	Foundations for Dynamic Equipment	The very detailed discussion contained in this document of dynamic and vibrational forces transmission and distribution would likely be useful in explanation of failure analysis. An entire section (4.6) is devoted to repair and upgrade of foundations and some discussion in 5.1 regarding improvements to subsurface conditions.	Section 4.6 and portions of 5.1 should be included in the Repair Code. Committee 562 will consider this recommendation.
355.1R-91	State of the Art Report on Anchorage to Concrete (not in MCP)	Anchors are used both as cast in place and post installed systems. Post installed systems whether mechanical or adhesive are common in repair situations. Section 2.5 deals with post installed systems. Chapter 3 discusses behavior of anchors, which is common to both types of systems, but Section 3.3 deals with behavior of anchors in cracked concrete which would be especially applicable to repair. Anchors by definition are used for attachments between components, which is common in repair situations.	Section 2.5 and 3.3 should be in the Repair Code commentary. Chapter 3 should also be included with editing. The entire document would be useful to reference in the code.



355.2-04	Qualification of Post-Installed Mechanical Anchors in Concrete	The entire document deals with anchorage to hardened concrete. Although not limited to repair situations, it is not associated with fresh concrete placement.	Should be included in Repair Code. This is a core document. It is referenced by ACI 318. This document is not in the MCP.
355.X (draft for ballot)	Qualification of Post-Installed Adhesive Anchors in Concrete	The entire document deals with anchorage to hardened concrete. Although not limited to repair situations, it is not associated with fresh concrete placement.	Should be included in Repair Code. This is a core document. The subject of 355.2 should be in the guide rather than the repair code. 562 will look into it.
357R-84	Guide for the Design and Construction of Fixed Concrete Offshore Structures	Very old and outdated document. Chap 7 completely out of date in methods and technical content. Sect 7.3 Repair of concrete, Sect 7.4 crack repairs	Delete chapter 7 from this doc and make reference to 546 docs. This document is 9 years old.
360R-92	Design of Slabs on Grade	Document deals with design and detailing of new slabs on grade. May need revision since even title appears obsolete. Only new construction. A revised document has been approved by TAC and is in the final stage of responding to TAC comments.	Leave document with committee.
362.1R-97	Guide for the Design of Durable Parking Structures	Section 1.4 Durability Concerns describes deterioration, corrosion, chlorides, and other aspects of durability and corrosion. This summary section is good but it must be coordinated with ACI 201 and ACI 222. The section does reference other ACI documents. Section 3.5 should refer to ACI 515.1R and ACI 546R discussion on protection systems. Generally the document does a good job of referencing other documents except for ACI 515 and ACI 546, which are not mentioned anywhere.	During next update, the document should include additional references.



362.2R-00	Guide for Structural Maintenance of Parking Structures	This document is primarily related to maintenance and ongoing assessment of parking structures. The discussion related to periodic assessment, periodic inspections, evaluation checklists, etc. is good but needs to reference ACI 364.1 and ACI 437R. 546R is mentioned in this documents short overview on repair which is good.	No action. Update references; Refer to 364; Use as model for other documents.
364.1R-94	Guide for Evaluation of Concrete Structures Prior to Rehabilitation	The entire document deals with Repair and rehabilitation situations	Should be included in Repair Code. Data Sheet Protocols may be better suited for 546. This is a stand alone document and it should be referenced but not be included in the code.
FAQ's	Frequently Asked Questions, not in MCP	In various stages of development with 10 completed and published. Designed to address "hot topics" of the repair industry not addressed by other documents in ACI.	Use information from published documents as appropriate, possible mechanism is to pose additional questions for needed topics to achieve consensus and TAC review for inclusion in Repair Code.
365.1R-00	Service-Life Prediction--State-of-the-Art Report	The document deals with service life of concrete, and words 'repair' and 'rehabilitation' appear frequently in the theoretical concept of 'when to repair or replace', but the document does not cover any specific repair methods.	This committee deals with the service life of new and existing structures. Methodologies for in-service inspection and condition assessment (Chap 3) should be coordinated with ACI 364.
371R-98	Guide for the Analysis, Design, and Construction of Concrete-Pedestal Water Towers	Limited discussion of repair of surface defects.	Excerpt information from repair documents such as ACI 546 and reference as appropriate.
373R-97	Design and Construction of Circular Prestressed Concrete Structures with Circumferential Tendons	The document relates to design and construction of new structures. There is no mention of repair.	Leave document as is with committee. Since the committee has knowledge in the area of external post-tensioning, it could be asked to consider the preparation of a repair document for circular structures. The committee should come up with recommendations for repair.



423.4R-98	Corrosion and Repair of Unbonded Single Strand Tendons	"repair" in this document is primarily related to repair of tendons. Limited discussion of concrete repair includes references to ACI 224 and 546	No action
423.6-01/423.6R-01	Specification for Unbonded Single-Strand Tendons and Commentary	"repair" in this document is primarily related to repair of sheathing	No action
437R-03	Strength Evaluation of Existing Concrete Buildings	The document deals with the evaluation of existing concrete structures from properties of material to in-situ load testing.	This document should be within the jurisdiction of TRRC as it pertains to the phase of structural assessment necessary prior to any repair/upgrade. If approved by TAC in the summer of 2006, it would be a core document. Should the evaluation be in ACI 364 as well? ACI committees do not distinguish repair related committees or documents in their numbering system. A classification system would be helpful (repair starts with R, etc.). This is a core document.
440.2R-02	Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures	The document is aging because the technology moves so fast. A new revision is expected shortly. This document is totally related to repair and upgrade of concrete structures.	This document should be within TRRC jurisdiction as it relates to existing structures. Core document; will go to TAC soon. The entire document is related to strengthening of existing structures. It is a core document related to 562.
440.3R-04	Guide Test Methods for Fiber-Reinforced Polymers (FRPs) for Reinforcing or Strengthening Concrete Structures	The document reports on test methods for material characterization since such test standards are not yet available in ASTM. ASTM itself is using this document as a strawman.	Leave document with committee. Test procedures will become ASTM documents later; one has already been approved by ASTM.



440R-96	State-of-the-Art Report on Fiber Reinforced Plastic (FRP) Reinforcement for Concrete Structures	Committee is balloting a new version of this document given the significant amount of interest and use in this technology. Ch. 7 of this document is completely devoted to strengthening and repair. Ch. 8, Section 3 is devoted to applications in repair.	Document will go to TAC in the summer of 2006. Since the major interest in the use of FRP is in repair and strengthening, there is a need for a separate SOA report on this topic. The committee does not seem interested. The document has just been approved by TAC. Can be used as reference. Possibly, document may be separated into new and existing structures. The recommendation is, however, to leave it as is.
503.1-92 (03)	Standard Specification for Bonding Hardened Concrete, Steel, Wood, Brick, and Other Materials to Hardened Concrete with a Multi-Component Epoxy Adhesive	Specification for reference as appropriate in repairs.	No action
503.2-92 (03)	Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive	Specification for reference as appropriate in repairs.	No action
503.4-92 (03)	Standard Specification for Repairing Concrete with Epoxy Mortars	Specification for reference as appropriate in repairs.	No action



503.5R-92 (03)	Guide for the Selection of Polymer Adhesives with Concrete	Specification for reference as appropriate in repairs.	No action
503.6R-97 (03)	Guide for the Application of Epoxy and Latex Adhesives for Bonding Freshly Mixed and Hardened Concretes	Sections discuss surface evaluation, concrete removal and surface preparation	503 should reference documents on surface evaluation, concrete removal and surface preparation
503R-93 (98)	Use of Epoxy Compounds with Concrete	Sections discuss surface evaluation, concrete removal and surface preparation	May want to reference documents on surface evaluation, concrete removal and surface preparation
504R-90 (97)	Guide to Sealing Joints in Concrete Structures	Section discusses header repair; Committee discharged; document is outdated; looking for a home committee for the document; should be split by parts into committees where they belong; TAC should send a letter to those committees and TRRC would contact them to discuss it.	Section should reference a document on header repair. The committee has been discharged. The document was reapproved in 1997 but it still is in MCP. TRRC recommends that this document is adopted by 515 or preferably 546. TAC should decide.
506.1R-98	Committee Report on Fibre Reinforced Shotcrete	Introduction mentions use in repair of tunnels and mine linings, surface repairs. Section 2.7 'Applications' – repair of deteriorated concrete surfaces, lighthouse and chimney repairs	
506.2-95	Specification for Shotcrete	Chapter 3 covers surface prep, finishing, curing, hot weather, cold weather, and other items related to placement.	Leave document status as is. Specification



506R-90	Guide to Shotcrete	There are numerous references to repair of concrete throughout the 506 document. There is current overlap with 546 repair guide, shotcrete being covered in both documents.	Core document for shotcrete. Shotcrete is both a construction and a repair process, so two documents may be needed. Either a new 506 document exclusively for concrete repair is needed, or 546 repair guide section on shotcrete should be expanded, and the 506 document edited. Should have a liaison member from ACI 546. This could be split into 2 documents.
515R	A Guide to the Use of Protective and Decorative Systems for Concrete	This document has not yet been approved by TAC. This review is based on the most recent draft. Chapter 2 is devoted to surface preparation. ACI 546 is referenced for repair of surface defects in cast-in-place concrete. This document also indicates that structural repairs require engineered repair. The committee is looking into expanding the document; no deadline set.	Although this document needs to go through TAC, no changes regarding concrete repair are required in the current draft. This document is not in MCP and may not be appropriate for this table.
524R-04	Guide to Portland Cement Based Plaster	Entire document is related to plaster, rather than concrete. No conflicts with 546. Chapter 14 covers repair of cracks, delamination, debonding, chemical attack, freeze-thaw	Leave document status as is. Committee should be encouraged to produce guidance on how to repair plaster.
533R-93	Guide for Precast Concrete Wall Panels	Material in 6.6 "Patching and repair" is covered in more detail in the Concrete Repair Guide (ACI 546R-04)	6.6 is an unnecessary duplication of more comprehensive repair information in other ACI documents. Replace this section with references to appropriate repair documents such as 546R-04.
543R-00	Design, Manufacture, and Installation of Concrete Piles	Repair is briefly mentioned, but no specifics regarding techniques or even references for further information. Damage is mentioned frequently, but usually as preventative measures. Some brief discussion about pile inspection is included, but nothing especially useful for repair.	543 should consider development of a repair guide.
544.1R-96	State-of -the-Art Report on Fiber Reinforced Concrete	Revision of a document originally published in 1982. Very outdated. For each chapter dedicated to a fiber type, there could be a section on repair applications that has become of interest in recent years. The revision has not been approved by TAC.	Leave document status as is. Ask committee to consider complete update and potentially include repair. The draft document was not approved by TAC last year; the status will be checked.



544.3R-93	Guide for Specifying, Proportioning, Mixing, Placing, and Finishing Steel Fiber Reinforced Concrete	As all other 544 documents, very outdated. There is mention of practices that are relevant to TRRC such as; a) bridge deck overlays, b) shotcrete coverings.	Leave document in committee discussion. Request committee to consider writing a document for repair applications.
546.2R-98	Guide for Underwater Repair of Concrete	This document does a good job of describing topics through reference in combination with differences associated with underwater repair work. References to ACI 546R and ICRI to be added.	No action. The draft document was not approved by TAC at this meeting; it will be redone.
546R-04	Concrete Repair Guide	This is of course one of the base repair documents. Once the ACI 546 Material Selection Guide a portion of this document should be revised to account for the detail of this new material selection information and refer to this documents for more detail. Chapter 4 Protective Systems should be revised and refer to ACI 515 for more detail once this document has been updated. The committee is looking into expanding the document; no deadline set.	No action Core document; should be referenced by others; material selection guide is nearing completion; possibly more than one document in the future; 364 and 546 should propose repair guide splitting into different documents; easier to focus on smaller documents for updates; other committees could reference the specification chapter only; one document should cover all aspects in a short version and refer to the shorter more specific documents. Repair and rehabilitation is too chaotic; an umbrella is needed; 546 would provide the overview document; the committee will give recommendations to TRRC. Chapter 3 Evaluation may be better suited for 364; 364 further supplements this one. 3rd draft is under consideration. Surface preparation: ACI 546 and ICRI are expanding this issue; use references rather than duplication; the ICRI document is limited in scope. 546 should refer to 304 for construction.
548.1R-97	Guide for the Use of Polymers in Concrete	Discusses patching	548 should reference documents on concrete removal and surface preparation



548.1R-97	Guide for the Use of Polymers in Concrete	Discusses construction procedures	May want to update references to other documents on construction procedures for PMC
548.2R-93 (98)	Guide for Mixing and Placing Sulfur Concrete in Construction	Sections discuss surface evaluation, concrete removal and surface preparation	May want to reference documents on surface evaluation, concrete removal and surface preparation
548.3R-03	Polymer-Modified Concrete	Sections discuss surface preparation and placing and curing concrete	May want to update references on surface preparation, placement and curing
548.4-93 (98)	Standard Specification for Latex-Modified Concrete (LMC) Overlays	Specification. Can such an overlay be a part of a repair?	No action
548.5R-94 (98)	Guide for Polymer Concrete Overlays	Deals with surface preparation, patching and crack repair	May want to refer to documents on surface preparation, patching and crack repair
551.1R-05	Tilt-Up Concrete Construction Guide	Sections discuss surface preparation, patching and crack repair	Sections should reference documents on surface preparation, patching and crack repair
551R-92 (03)	Tilt-Up Concrete Structures	Section discusses crack repair	Section should reference a document on crack repair