

ACI Committee 548 - Polymers in Concrete

Agenda

Dallas, TX

Date: **October 30, 2001**
Place: **Wyndham Anatole Hotel**

Time: **8:30 – 11:30 AM**
Room: **Rosetta**

1. Call to Order
2. Introduction of Members and Guests.
3. Minutes of the Philadelphia Meeting, March 26, 2001
 Main Committee (with sub-committee attachments)
4. Proposals for future technical sessions
5. Publication report for **ACI 548 – The First 30 Years**, Spring 2001, Richard Prusinski
6. Ballot Reports
 - 6.1. ACI 548.3R-XX
 - 6.2. Standard Specifications for Type EM Polymer Concrete Overlays
 - 6.3. Provisional Test Method for Load Capacity of Underground Utility Structures
7. Sub-committee reports:
 - 548-B - **Polymer Concrete Overlays**, Mike Stenko, Chairman
 - 548-D - **Sulfur Concrete**, Garth Fallis, Chairman
 - 548-E - **Structural & Design Analysis of Polymer Concrete**, Dave Whitney, Chairman
8. Liaison reports:
 - ASTM, ICRI, ICPIC, SSPC, TRB, Others
9. Report on **International Congress on Polymers in Concrete**, May 21-24, 2001, Dave Fowler
10. Status of **State-of-the-Art Report on Precast Sulfur Concrete**
11. Any Other Old Business
12. New Business
13. Next Meeting – April 21-April 26, 2002, Marriott Renaissance Center, Detroit, MI
14. Presentations by Members & Guests.

Attachments:

- [548 Main Committee Minutes - Philadelphia](#)
- [Subcommittee B Minutes](#)
- [Subcommittee D Minutes](#)
- [Subcommittee E Minutes](#)

Convention Committee Schedule

548	Polymers	Tues	8:30a-11:30a	Rosetta
548-B	Polymer Concrete Overlays	Mon	8:30a-11:30a	Obelisk B
548-D	Sulfur Concrete	Mon	11:30a-1p	Obelisk B
548-E	Structural Design & Analysis	Mon	2:00p-5:00p	Obelisk B

ACI Committee 548 - Polymers in Concrete

Committee Minutes

March 26, 2001, Philadelphia, PA

1. The meeting was called to order by Chairman, Al Kaeding at 8:31 a.m. and self-introductions followed.

2. The following signed the attendance form:

Members: (27)

Al Kaeding, Chairman	Bill DePuy	Michael Sprinkel
Art Weiss, TSC Contact	Jim Dikeou	John Robinson
Jim Maass, Secretary	Jack Fontana	Bob Gaul
Don Schmidt	H.R.Dan Edwards	Wafeek Wahby
Mahmoud Reda Taha	Mike Stenko	Brad Nemunaitis
Hank Marsh	Tom Wickett	Don Tragianese
Richard Prusinski	Dave White	David Fowler
Constantin Bodea	Garth Fallis	George Hoff
Milton Anderson	Harold Weber	C. Vipulnandan

Visitors: (7)

Sue McCraven	Gerald White	Don Wade
Bob Borja	Sandra Spronts	Philip Yang
Tom McCall		

3. David Fowler moved and Mike Stenko seconded a motion that the minutes of the Toronto Meeting, October 17,2000 be approved. The motion passed by unanimous vote.

4. Committee Goals: Committee Chairman, Al Kaeding, suggested the following goals for 2001:

- Publish session volume for Spring 2001 session
- EM Overlay specs to TAC
- Test method to TAC
- SC Report to TAC
- Complete ES Specs
- Publish revised 548.6R

It was moved by Mahmoud Reda Taha and seconded by David Fowler that these suggestions be accepted. The motion passed by unanimous vote.

5. Technical Session, **ACI- The First 30 Years**, spring 2001, Richard Prusinski, Task Group Chair.

Richard Prusinski reviewed the session to be held Wednesday, March 27.

6. Proposals for future technical sessions: A number of suggestions were made which included

- Overlays,
- Recent developments in quality control,
- Structural design and application,
- “Best of the best” from ICPIIC.

A motion was by David Fowler and seconded by Garth Fallis to request two (2) sessions in the next 18 months on topics to be decided later. Motion was passed unanimously.

7. **ACI 548.6R-96**-status report:

Reported below under 548-E because of absence of Chairman Whitney.

8. Sub-committee reports:

- **548-B Polymer Concrete Overlays**, Mike Stenko, Chairman reported that committee met yesterday with 15 members and 2 guests in attendance. Meeting was devoted to discussion of revision of **EM Polymer Concrete Overlays**. Time will be devoted later in this meeting to complete discussion. Goal is to be prepared to rebalot shortly after meeting.
- **548-D Sulfur Concrete**, Garth Fallis, Chairman reported that committee met yesterday with 5 members in attendance. Based on work done in committee, **548-D State-of-the-art** report to be sent to TAC for ballot.

9. Liaison reports:

- ASTM – committee CO3 will be meeting April 19-20 at the Four Points hotel in Charlotte, N.C.
- Richard Prusinski reported that he had a copy of the SPI’s Polymer Concrete test methods published in the 1970s. Chairman, Al Kaeding reported that he had been part of the group and that the group was no longer in existence. Al further noted that most of the test methods are now ASTM test methods
- ICRI – Group met last week and is completing a general overview document to be used as a guide for testing and evaluation of polymer based flooring
- TRB – Group met last January in Washington D.C. David Fowler is the groups’ new chairman. The group will sponcer two sessions in January 2002
- CFA – Group will meet again in September in Las Vegas.

10. International Congress of Polymers in Concrete scheduled for May 21-24, 2001 in Hawaii. Congress Chairman, David Fowler reported that there were already 75-80 papers and they are expected to be approved. Bill DePuy made available literature on the conference and hotel information.

11. Status of State-of-the-art Report on Precast Sulfur Concrete (see 548-D above)**12. Standard Specification for Type EM Polymer Concrete Overlays** discussion.

Al Kaeding relinquished the chair to Sub-committee Chairman Stenko. Mike Stenko reviewed changes in specification made in yesterday's meeting. Referring to the Draft Document the discussion then continued with the following changes:

- Page 17, line 10 to read as follows: “surface shall meet or exceed requirements of ICRI No. 03732 Standard CSP 5. Motion made by John Robinson and seconded by Milton Anderson. Motion passed.
- Page 16, line 12. Last sentence to read as follows: “The ICRI standard determined by test patches shall be used as a guideline...” Motion made by Mike Sprinkel and seconded by Tom McCall. Motion passed.
- Page 17, line 23. Last sentence to read as follows: The first course shall be applied within 24 hours, if longer a bond test must be performed.” Motion by Garth Fallis and seconded by Tom Wickett. Motion passed.
- Page 19, line 19. Sentence in middle of line to read as follows: “Broadcast 7 kg/m² of aggregate until polymer is in excess and is completely covered.” Motion moved by Garth Fallis and seconded by Tom Wickett. Motion passed.

Mike returned the chair to Chairman Kaeding at the conclusion of this discussion.

7. (Skipped from above) Chairman, Al Kaeding reported that ACI 548.6R-96 was sent to TAC. TAC reviewed on Sunday morning. Being 3R'd and will be reviewed and reballoted before the next meeting.
8. Proposed **Provisional Test Method for Load Capacity of Underground Utility Structures**. Al Kaeding announced that this document is under review by Committee 548-E. This is a document similar to one published by the Western Underground Committee in 1990. The hope is to update and publish this as an ACI Document.
9. Old Business: Al Kaeding reported that Gerry Walters has completed his work on 548.3R Polymer Modified Concrete has been completed. The document will be sent to 548 Polymer Modified Concrete headed by Don Schmidt of Rohm and Haas for comment and review.
10. New Business: Jim Maass reviewed current status of EPA actions related to styrene. Under the new standard cast applications are exempt.
11. Next Meeting – October 29, 2001 in Dallas, Texas.
12. Meeting adjourned at 10:54 by chairman, Al Kaeding. Following adjournment members and guests made announcements.

MINUTES OF SUBCOMMITTEE 548B, POLYMER CONCRETE OVERLAYS
March 26, 2001 2:00 p.m. -5:00 p.m.
Room 410, Marriott Hotel, Philadelphia, Pennsylvania

The meeting was called to order at 2:00 p.m. by Chairman Mike Stenko. Mr. Stenko began the meeting with self-introductions. The meeting attendance form and the subcommittee membership roster were circulated. The updated subcommittee membership list is attached to these minutes. The following attendees signed the meeting registration form:

MEMBERS (14)

Mike Stenko, Chairman	John Robinson
H. Dan Edwards, Secretary	Michael Sprinkel
Milton D. Anderson	Wafeek Wahby
Frank Constantino	Richard Weyers
Bob Gaul	David White
Al Kaeding	David Whitney
Don Tragianese	Tom Wickett

VISITORS (3)

* Bob Borja	*Brad Nemunaitis
* Arif Chawalwala	

*Indicated interest in being added to the subcommittee membership roster.

Review of the Minutes from the Fall 2000 Meeting

David Whitney moved and Michael Sprinkel seconded that the minutes be approved as written. This motion passed unanimously.

Resolution of Negatives and Comments from the Balloting of “The Standard Specification For TYPE EM Polymer Concrete Overlays”

Chairman Stenko reviewed the comments and negatives from the most recent balloting of the Type EM overlay specification with the intention of resolving those issues. The first of these concerned the reference to ACI503R (see especially “Notes to the Architect/Engineer”). John Robinson pointed out that it had been voted at the Toronto meeting to include this reference in the overlay specifications beginning with Type EM. With ACI503R having been balloted on March 28, 2001, it cannot now go into the Type EM specification, only in a checklist. Assuming ACI503R passes, it will still have to undergo TAC review. John Robinson said that although values are quoted for the “pull-out” test, there is no test method without ACI503R. Chairman Stenko suggested *ACI503R be employed now in the draft of the Type EM specification and that the Type EM specification be paced so that it passes after ACI503R does.* Michael Sprinkel moved and Milt Anderson seconded to adopt this approach. The motion passed unanimously.

A second housekeeping issue was then undertaken. There was a general consensus that the designation “EM” needed to be defined early in the specification. John Robinson moved and Tom Wickett seconded *to include the definition of EM in parentheses immediately under the title of the specification.* The motion passed unanimously. Discussion then turned to the description of the specification on page 1 beneath the specification title. It was felt the description as currently stated did not adequately cover the role of the overlay in protecting the substrate. Michael Sprinkel, Frank Constantino and Richard Weyers thoroughly discussed the implications of terms such as “skid-resistant” and “negligible permeability”. Following the discussion, Michael Sprinkel moved and Milt Anderson seconded that *page 1, line 9 be reworded to read “...epoxy system with selected aggregate to produce a flexible, skid-resistant and protective overlay.”* The motion passed unanimously. Before considering the main body of the

document, keywords were discussed. Tom Wickett moved and John Robinson seconded that “*surface preparation*” be added to the list of keywords. The motion passed unanimously. We then moved to the Mandatory Specification Checklist on page 5.

Item 3.1 (page 5 and 6): Bob Gaul suggested that the “pipe cap pull-off test” be required whenever surface milling is done. Michael Sprinkel said that this test identifies problems with grinding and milling of surfaces. John Robinson moved and Tom Wickett seconded *to move the content of lines 3-9 on page 6 (Alternate methods which may...caused by these processes.) to Section 3.2 on Surface preparation.* The motion passed, but was opposed by Richard Weyers. Further discussion followed especially regarding the appropriateness of grinding and milling and substrate preparation. Don Tragianese said that grinding and milling should not be considered surface preparation. He moved and Milt Anderson seconded *to add a sentence to page 6, line 3 following “...in the project specifications” which reads “If removal of existing surface materials is necessary prior to surface preparation, grinding and milling is acceptable however it should not be considered surface preparation.”* This motion passed unanimously.

Item 3.4.5 (page 6): There was discussion about whether two or three layers of application are necessary to optimize the reduction in permeability important for steel decks. Michael Sprinkel said it is misleading to put a proviso up-front suggesting three layers when there are years and many examples to prove two layers are often sufficient. He continued saying that we are specifying two layers, and when three layers are employed a separate specification is needed. Michael Sprinkel moved and John Robinson seconded *to remove the sentence “While a 6 mm thick overlay... of at least three layers.”* The motion passed unanimously.

Item 1.1.1 (page 7, line 8): Michael Sprinkel moved and Milt Anderson seconded *to remove “ramps and slab-on-grade pavements.”* The motion passed unanimously.

Items on page 9: Editorial change to the correct name of ASTM test method C579-96. Michael Sprinkel moved and John Robinson seconded *to remove ASTM test method C882-99.* This is because bond strength is no longer shown to be a physical property of the binder in Table 2.2, and since we are now reinstating ACI503R, it and bond strength of the polymer concrete are reinstated in Table 2.4. The motion passed unanimously.

Table 2.3 and Item 1.3.2: John Robinson moved and Tom Wickett seconded *to delete both references to ASTM D75.* The motion passed unanimously.

Item 1.3.2 (page 9): John Robinson pointed out that ASTM 2196 is for thixotropic resins and ASTM 2393 was dropped by ASTM. Therefore he suggested that editorial changes be made to *replace ASTM 2196 in both Table 2.1 and Item 1.3.2 with ASTM 2393-79.*

Item 1.5 Labeling (page 11, line 4): Tom Wickett moved and Milt Anderson seconded *to add “Warning for Toxicity” as a bullet item.* The motion passed unanimously.

Item 1.6.2 (page 11, lines 14 and 15): Milt Anderson moved and Tom Wickett seconded *to strike “and falling.”* This motion passed unanimously.

Item 1.6.3 (page 11, lines 17-20): Don Tragianese moved and Richard Weyers seconded *for this sentence to read “Do not commence overlay placement during any period where 70 ml jobsite production samples have gel times less than ten minutes or the broadcast aggregate cannot be applied and bonded to meet the minimum requirements for bond strength given in Table 2.4.”* The motion passed unanimously.

Table 2.1: Milt Anderson moved and John Robinson seconded *to show the value for gel time to be 15-45 minutes.* The motion passed. Bob Gaul opposed it.

Table 2.2: John Robinson moved and Brad Nemunaitis seconded *that where Test Method now shows ASTM D638, it be changed to show ASTM D638 Type I.* The motion passed unanimously.

Item 2.2 Aggregates (page 13, line 10): Milt Anderson moved and John Robinson seconded to reword this Item as “*Aggregates shall meet the requirements in Table 2.3 and have a hardness on the Mohs scale of six or more. Aggregates shall be angular and shall consist of...*” The motion passed unanimously.

Table 2.3: Michael Sprinkel said that we should follow Task Force 34 precedent for aggregate grades. Mike Stenko asked for a volunteer to see that product specifications are obtained from the three major aggregate suppliers for use in building a consensus Table 2.3 especially so “fines” are negligible. Michael Sprinkel agreed to do this.

Table 2.4: John Robinson moved and Frank Constantino seconded *that the thermal compatibility test sample aggregate filler loading be specified to be the same as used for the compressive strength property determination.* The motion passed unanimously.

Item 3.1.2 (page 15, line 17): John Robinson suggested that this sentence read “...greater than 50%...” which would correct a typographical mistake. Richard Weyers asked what if the bond test results in failures in the concrete substrate that are consistently greater than 50%, but below the specified minimum bond strength? Does this mean the concrete is too weak to support the overlay? He suggested putting a comment in “Notes to the Architect” to the effect that the overlay is not recommended in some specific instances. Bob Gaul suggested a comment be added to the scope stating that this is a specification where the concrete has some stated minimum strength. John Robinson said this should be part of a “pre-test” prior to awarding the contract. Michael Sprinkel moved and John Robinson seconded *to put on page 1, after line 10 and on page 6 above the Mandatory Specification Checklist the sentence “Concrete shall be in good condition and have a potential rupture strength of at least 1.4 MPa.”* This motion passed unanimously. John Robinson said a pre-bid checklist should also contain this proviso.

Adjournment: The meeting was adjourned at 5:05 p.m. following the motion of Milt Anderson and second of David Whitney. The business of the subcommittee was concluded the next day during the meeting of Committee 548. Significant actions taken during that session follow.

Item 3.1.3 (page 16, line 12): Michael Sprinkel moved and John Robinson seconded *to delete the sentence beginning “The average macro texture...” and replace it with one reading “The ICRI standard determined by test patches shall be used as a guideline to gage adequate preparation during surface preparation.”* The motion passed unanimously.

Item 3.2.1: There was discussion about the best choice of CSP value. John Robinson said that CSP6 best represents exposed aggregate. Tom Wickett said that CSP5 is for a self-leveling overlay. Milt Anderson suggested CSP5 or better because it is sometimes not desirable to fully expose coarse aggregate. Tom Wickett moved and Milt Anderson seconded *that the last sentence in 3.2.1 be changed to read “The prepared surface shall meet or exceed the requirements of ICRI No. 03732 Standard CSP 5.”* The motion passed unanimously. It has been mentioned that the wording “The prepared surface shall have an ICRI CSP standard that is similar to that on which the passing test patches were placed”. The subcommittee may want to revisit this issue at a later meeting.

Item 3.2.4 (page 17, line 23): The practicality of putting a first coat on within 12 hours of completing the surface preparation was questioned by Garth Fallis. Michael Sprinkel said it should be done as fast as possible (wording from the VDOT spec), but no later than within (some period of time that is agreeable to all). Milt Anderson said that no chemical changes occur to the substrate within 24 hours, but many physical changes can occur (e.g. dust storm, severe weather, re-opening to traffic). Garth Fallis moved and David White seconded *this sentence read “The first course must be applied within 24 hours or if longer, a bond test must be conducted to verify the adequacy of the substrate.”* The motion passed unanimously. Alternative wording could be considered as *“The first course shall be applied within 24 hours after cleaning. For longer periods of time, additional bond tests must be performed.”* Mike Stenko mentioned that we should define when to conduct the bond test.

Item 3.4.8: Tom Wickett said that there is a need to specify the amount of aggregate (7 kg/m² in this case) to insure there is no partial cure of the matrix resin. Mike Stenko said that he prefers the term “complete saturation” to avoid local inconsistency and wet spots. Michael Sprinkel said that on the second layer you want tips of the aggregate to be protruding. He suggested Task Force 34 language “aggregate shall be applied to cover polymer mixture

completely; first layer 5.4 kg/m²; second layer 7.6 kg/m²". Task Force 34 also has a table specifying weights. Garth Fallis suggested the term "apply until refusal". Don Tragianese said that densities may complicate the issue. Garth Fallis moved and Tom Wickett seconded *that the language specify "coverage rates of at least 2.0 liter/m² of binder and broadcast at least 7 kg/m² aggregate until the polymer material is covered."* The motion passed unanimously.

Subcommittee 548-D, Sulfur Concrete Meeting Minutes

Date : Monday, March 26, 2001
Location : Philadelphia Marriott, Philadelphia
Time : 11:30 AM - 1:00 PM

1. Introduction

1.1 The meeting was called to order by Garth Fallis at 11:30 AM.

1.2 Attendees :

- Members

Garth Fallis
Al Kaeding
Harold Webber
Chris Ball
Bob Gaul

1.3 Garth Fallis took the minutes of the meeting.

2. State-of-the-Art Report Precast Sulfur Concrete

2.1 The ballots were reviewed.

2.2 The editorial comments were addressed and resolved.

2.3 One negative comments was discussed and Garth will address and discuss with the negative voter to see if can be resolved.

2.4 Garth Fallis will make the changes to the document and it will be issued to TAC.

3. State-of-the-Art Report Waste Encapsulation using Sulfur Concrete

3.1 Garth Fallis and Harold Webber are to collect the appropriate information and develop a first draft for a State-of-the-Art Report Waste Encapsulation using Sulfur Concrete.

4. ACI 2001 Fall meeting

October 28 - November 2 - Dallas, Texas

5. The meeting was adjourned at 12:40 PM.

MINUTES OF SUBCOMMITTEE 548E, POLYMER CONCRETE STRUCTURES
March 26, 2001, 8:30am-11:30am
Room 410, Marriott Hotel, Philadelphia, Pennsylvania

Minutes for this subcommittee meeting were not available.