

**ACI 362 - PARKING STRUCTURES
SUBCOMMITTEE**

Minutes of Meeting

Dallas, Texas

March 18, 2012

LIST OF ATTENDEES

<u>MEMBERS</u>	<u>ASSOCIATE MEMBERS</u>	<u>VISITORS</u>
<p>Jim Donnelly Harry Gleich Tony Kojundic Tom D'Arcy Tom Downs Kurt Wagner Ned Cleland Carl Walker Mo Iqbal</p>	<p>Larry Church Brian Pulver</p>	<p>Bill Doughty James Tkach</p>

1.0 CALL TO ORDER / ATTENDANCE

Secretary Donnelly called the meeting to order. Meeting attendees briefly introduced themselves and a sign-in sheet was passed around. Those in attendance are listed above. Secretary Donnelly indicated that he had spoken to Chairman Erich Martz and passed on his regrets that he was unable to attend.

2.0 PURPOSE OF MEETING

Secretary Donnelly discussed the reason that the Maintenance Document and Material Subcommittees were developed and what would be produced by these two subcommittees. The work of both subcommittees was to be discussed during this meeting, starting with the Maintenance Document Subcommittee.

3.0 MAINTENANCE DOCUMENT SUBCOMMITTEE

3.1 Agenda

An agenda for this portion of the meeting had been developed by Larry Church, Subcommittee Chair, prior to the meeting, which was e-mailed in advance of the meeting to the individuals who signed up for this subcommittee. A copy of this agenda is attached to these minutes. Secretary Donnelly then turned the meeting over to Subcommittee Chair Church, who proceeded to review the meeting agenda with respect to the development of the updated Guide for Structural Maintenance of Parking Structures.

3.2 General Discussion

There was a discussion among the committee members regarding whether the new document should state what party is responsible for the maintenance of a parking structure. It was recommended that such a statement be included in Chapter 1 or 5.

Prior to the meeting, Tom Nehil had e-mailed his comments regarding adding certain topics to the new document, so his comments were reviewed. One comment involved adding special consideration for hybrid systems such as Filigree slabs, metal hybrid systems, and precast panels. It was decided that these systems could be added in a new Section 4.8, and Mr. Nehil was assigned this task. A second comment involved adding more types of waterproofing systems to Section 3.2.4 - Elastomeric, Traffic-Bearing Membranes, such as buried systems or thicker systems to be more consistent with Guide for Design of Durable Parking Structures. The subcommittee agreed that this was a good suggestion

In Section 3.2.4 of the existing document, it was pointed out that the document says that traffic-bearing membranes can be expected to be effective for 10 years or more in parking structures. Is 10 years too much to promise? Need to refine this or provide rephrasing of durability.

Larry Church raised the possibility of adding service life or life cycle cost analysis information to the document. It was generally agreed by the subcommittee that a chapter could be added for this, however, this would need to be done carefully so as to reference and not conflict with service life documents already created by other committees.

It was suggested that annual inspections should be tied in to service life and life cycle costs, perhaps at the end of that section. The service life/life cycle cost information can be added as new Chapter 6. It was pointed out that, because this document was limited to structural maintenance of a parking structure, service life information should be presented with that focus.

Chapter 3 in the existing document is entitled Deterioration Problems Associated With Parking Structures, but has text regarding sealants and waterproofing in it. It was proposed that these topics could be pulled out and put into a separate protection options or systems chapter. The current document discusses problems that can result if sealants and waterproofing are not maintained.

Table 1 - Parking Facility Structural Maintenance Tasks and Frequencies in the existing document uses the phrase “as required” for several entries. It was suggested that the phrase “As Required” be defined further or replaced with more descriptive text in order to be more useful for Owners. It was mentioned that we don’t want to make the text for these entries too prescriptive or too large.

It was suggested that the revised document may need to gain/develop a broader view to include sustainability, which involves longer service lives. The entire document should be reviewed with respect to this.

The Subcommittee discussed if this document will be only maintenance-related or whether it should include repair. Harry Gleich felt that repair and maintenance should be two separate documents, with the maintenance document intended for the garage Owner/Operator and the repair document intended for the contractor. It was commented how the repair document could be problematic because it could repeat efforts on other documents. It was suggested that the repair document could be more of a road map to guide repair decisions. Carl Walker volunteered to provide an outline for this document. Secretary Donnelly reinforced that this document should focus on what should be done rather than how. At the end of the meeting, Mr. Walker submitted his outline to Secretary Donnelly to type up

for discussion at the main committee meeting tomorrow. Carl Walker verbally reviewed the outline. A copy of the outline is attached.

3.3 Re-approval of Existing Document

It was discussed that the process of updating the document could take a couple of years, and with the existing document published in 2000 and reapproved in 2005, the existing document should be reapproved for the duration of the updating process. The subcommittee agreed to recommend reapproving this document to the main committee. Tom Downs volunteered to develop verbiage for the balloting reapproval of the existing document as it stands to keep it active

3.4. Outline

Based on the discussion above, the outline for the new maintenance document was revised. A copy of the revised outline is attached. Chapter titles were reviewed, and the appropriateness of each was discussed, and the title revised as suggested.

3.5 - Chapter Authors

Based on the revised outline, volunteers for the various chapters and new sections were requested. The following lead authors volunteered or were selected:

Chapter 1 - Introduction - Tom D'Arcy

Chapter 2 - Developing a Maintenance Program - Kurt Wagner

Chapter 3 - Deterioration Problems Associated with Parking Structures - Brian Pulver

Chapter 4 - General Maintenance Considerations - Tom Downs

Chapter 5 - Maintenance Tasks and Frequencies Affecting Parking Structure Performance - Tom D'Arcy

Chapter 6 - Service Life and Resiliency - Larry Church (assisted by Tom Nehil on the items he suggested, including adding information for alternate membrane systems from Section 4.6.3 of Guide for Design of Durable Parking Structures).

Added Sections: 4.2 - Drains and Drainage - Tom Nehil
4.8 - Hybrid Structures - Tom Nehil

3.6 Additional Chapter Comments

Chapter 2: Frequency of repair could be discussed in Chapter 2. Additionally, the phrase “as required” could be defined herein.

Chapter 3: Remove “problems” from title of Chapter 3.

Chapter 4: No additional comments.

Chapter 5 - The table (Table 1) should be updated. PIC and NPA documents can be used as a reference to see areas where this table can be improved. The table should include only maintenance tasks and frequencies affecting structural performance of parking structures. Title is good but was revised per revised outline. Tom D'Arcy will add introductory paragraphs and will make sure to

indicate that even if an element is not structural, if left unmaintained its deterioration can cause problems in the structure.

Chapter 6: This section will be written to talk about protection of the structure, how its protection will affect life and durability, and how you go about doing a life cycle cost analysis. Lifecycle costs should be presented not in a step-by-step way, but more how to undertake this type of study and what the information can yield. Title may change from that shown in the revised outline. Jim Donnelly and Larry Church added subtopics to Chapter 6 in the revised outline.

3.7 - Date of First Draft

1st draft of each chapter by Toronto was recommended.

3.8 - Appendices

Discussion was initiated by Kurt Wagner about what should be done with the Appendices. Tom Downs agreed to review Appendices A and B. Kurt Wagner agreed to review Appendix C as part of Chapter 2.

3.9 - Word Version of Document

Secretary Donnelly mentioned that ACI was preparing a Word version of the existing document, which will be distributed to subcommittee members.

3.10 - Subcommittee Membership

Tom Downs and Kurt Wagner will be added to subcommittee since will be chapter authors.

3.11 - Figures

It was suggested that pictures should be replaced or updated.

4.0 MATERIALS SUBCOMMITTEE

Tony Kojundic as chair of the material subcommittee led this portion of the meeting. This subcommittee was created because in previous committee meetings, the committee felt that the materials portion of the Guide for Design of Durable Parking Structures needed to expand on pozzolans, etc.

4.1 - Draft Tech Notes

ACI created the Tech Note document classification in 2005 or 2006 to provide a means for detailed discussion of a particular topic not currently adequately addressed in committee documents. After a brief discussion about what Tech Note should be, Tony Kojundic showed a description of what Tech Note is. It was mentioned that a Tech Note should typically consist of no more than roughly 3,500 words for electronic viewing. The subcommittee agreed that this seemed like an appropriate approach for this issue.

Prior to the meeting, Tony Kojundic, Prakash Surali, and Jack Gibbons took a stab at developing a Tech Note on Supplementary Cementitious Materials (SCM) in Concrete Parking Structures. Mr. Kojundic showed the subcommittee what had been drafted so far, including one example project where SCMs were used. He indicated that the document currently had approximately 1,000 words, so it had space for 2 more projects, and suggested that it would be good if one of the projects included slag since it was not included in the first example. Silica fume and fly ash were included in the first

example project, so it was agreed by the subcommittee that the next project should include slab. If Prakash Surali and Jack Gibbons don't have a good example slag project, this could be opened up to the main committee.

It was suggested that this document would be an appropriate place to include the concept of sustainability. It was also mentioned that the concrete industry talks about resiliency instead of sustainability. Because the SCM document is halfway complete, it was agreed that adding sustainability text can wait until the document is fully developed.

5.0 MEMBRANE SYSTEMS SUBCOMMITTEE

The proposed membrane systems subcommittee was briefly discussed. No progress has been made to date, but subcommittee members were needed to move this effort forward.

6.0 MISCELLANEOUS DISCUSSION

A question was asked if we have anything about performance specifications or other specifications in Guide for Design of Durable Parking Structures. Carl Walker asked whether ACI 362 should have a Tech Note regarding Performance Specifications.

7.0 NEXT MEETING

Toronto, Ontario, Canada (Fall 2012 Convention)

- Sunday, October 21, 2012 -12:00 noon to 3:00 p.m. (Subcommittee Meeting)

8.0 ADJOURN

A motion to adjourn was made, seconded and approved.



Agenda

ACI 362.2 – Revision/Update Guide for Structural Maintenance of Parking Structures

**Sunday, 3/18/2012
12:00 PM - 3:00 PM
Hyatt Regency Dallas
CUMBERLAND H
Dallas, TX**

[Please mark the attendance sheet and check the accuracy of the contact information]

- 1. WELCOME AND ANNOUNCEMENTS**
- 2. INTRODUCTIONS**
- 3. APPROVAL OF AGENDA, MINUTES**
 - a) Approval of Agenda
 - b) First meeting – no Minutes
- 4. Review & Update of existing Chapters.**
 - a) Chapters Title revisions
 - b) New Chapters
 - c) Subchapter updates, changes, new
 - d) Leaders for each Chapter
 - e) Volunteers
 - f) Suggestions for Organizing the Update
 - g) Time Frame for meetings and ballots
- 5. Meetings and Conference Scheduling**

Fall 2012 ACI Convention will be held October 21-25
Sheraton Centre, Toronto, ON, Canada
- 6. Other Business**
- 7. Adjournment**

Enclosures:

**Previous Document Chapter Outline
- New Document Draft Outline**



ACI 362 - PARKING STRUCTURES

Outline for Possible Rehabilitation Document

- 1. Condition Appraisal Report (See ACI 362.2 Section 2.4)**
 - 1.1 Review of construction documents, if available**
 - a. Determine design criteria**
 - b. Compare design criteria to ACI 362.1 (Guide for the Design of Durable Parking Structures)**
 - 1.2 Visual survey - Cracking, scaling, spalling, leaking, joint deterioration, other**
 - 1.3 Delamination survey**
 - 1.4 Testing - Compare to design criteria**
 - a. Strength**
 - b. Air content - Linear traverse**
 - c. Petrographic - Aggregate, mortar quality**
 - d. Chloride ion**
 - e. Half cell**
 - f. Cover**
 - g. Carbonation**
- 2. Repair Design**
 - 2.1 Review appraisal data - set life cycle goals**
 - a. Compare design criteria to ACI 362.1 (Guide for the Design of Durable Parking Structures)**
 - 2.2 Determine required repairs**
 - 2.3 Detail/specify repairs**
- 3. Types of Construction Contracts - Bidding, Negotiation, Other**
- 4. Construction - Inspection, Observation, Supervision**
- 5. Preventive Maintenance - Future Repairs**



ACI 362.2 – Revision/Update Guide for Structural Maintenance of Parking Structures

Chapter 1—Introduction (D’Arcy)

Add text regarding responsibility for maintenance (D’Arcy)

Chapter 2—Developing a maintenance program (Wagner)

- 2.1—The project maintenance manual
- 2.2—Periodic inspections
- 2.3—Preventive maintenance
- 2.4—Conditional appraisals

Chapter 3—Deterioration problems associated with parking structures (Pulver)

- 3.1—Concrete-related deterioration
 - 3.1.1—Scaling
 - 3.1.2—Corrosion
 - 3.1.3—Delaminations
 - 3.1.4—Spalling
 - 3.1.5—Cracking
 - 3.1.6—Leaking
 - 3.1.7—Leaching
- 3.2—Sealants and waterproofing
 - 3.2.1—Contraction and construction joint sealants
 - 3.2.2—Seals for isolation joints and expansion joints
 - 3.2.3—Concrete sealers
 - 3.2.4—Elastomeric, traffic-bearing membranes (ref. ACI 362.1 for addl. systems)
(Nehil to provide added/revised text)
- 3.3—Structural elements and related items
 - 3.3.1—Concrete deck surface
 - 3.3.2—Beams, columns, and walls
 - 3.3.3—Stair and elevator towers
 - 3.3.4—Exposed metals

Chapter 4—General maintenance considerations (Downs)

- 4.1—Housekeeping and cleaning requirements
- 4.2—Drains and drainage (Nehil)
- 4.3—Snow removal and ice control
- 4.4—Other operational maintenance
- 4.5—Aesthetic-related maintenance
- 4.6—Precast/prestressed concrete
- 4.7—Post-tensioned concrete
- 4.8—Cast-in-place, conventionally reinforced-concrete structures
- 4.9—Hybrid structures (Nehil)

Chapter 5—Maintenance tasks and frequencies affecting parking structure performance (D’Arcy)

Chapter 6—Service life and resiliency (Church)

- 6.1—Definition of service life
- 6.2—Maintenance options to prolong service life
 - a. Sealants and waterproofing

6.3 —Life Cycle Cost Analysis

6.4 —Resiliency

Chapter 7—References

7.1—Referenced standards and reports

7.2—Cited references

Appendix A—Snow removal (Downs)

Appendix B—Deicing procedures (Downs)

Appendix C—Checklist for structural inspection of parking structures (Wagner)