MINUTES
ACI Committee 345 - Bridge Construction, Maintenance, and Repair
Spring 2011 Convention
Tampa, FL
Westin - Steele
Sunday, April, 2010, 1:30 pm to 3:30 pm

1) **Opening:** Chairman Michael Brown opened the meeting at 1:32 pm.
2) **Introductions:** All those present introduced themselves.
3) **Approval of minutes**
4) **Membership status:**

According to ACI records, the committee currently has 2 officers and 12 other voting members, 6 consulting members, and 25 associate members.

Voting Members present: Michael Brown (Chair), Rita Oglesby (Secretary), Andrew Foden, Oliver Gepraegs, Paul St. John, Johan Silfwerbrand, Michael Sprinkel, Mark Williams

Voting Members not present: Jesse Beaver, Yail Jimmy Kim, Alan Matejowsky, Claudia Pulido, Harold Sandberg, Richard Weyers

Associate Members present: Devin Harris, Davod George Morcous, Jeff Smith, Ron Vaughn, Richard Huza,

Visitors present: Chris Carroll, Tim Gillespie, David McDonald, Klahed Nahlawi, Luis Ramos, Aymer Syed, Chris Waldron

Status changes: Andrew Foden upgraded to voting member; Richard Huza and Ron Vaughn, are new Associate Members

6) **Technical Presentations:**
   a) Spring 2011 – joint session with 343 – Bridge Design
      "Accelerated Bridge Design and Construction"
      Co-Moderators: Andrew Foden, Michael Brown
      Tues 2 – 5, Marriott 4
   b) Fall 2011 – joint session with 302, 223
      Co-Moderator: Fred Goodwin
      "In Honor of Robert Gulyas"
      The 345 membership suggested that the current title be augmented with a technical subtitle indicating the topics to be presented in this special commemorative session. Chair Brown agreed to coordinate this with moderator Fred Goodwin.

   c) ACI SP 277 – "Seismic Rehabilitation of RC Bridges by Using FRP and SRP" has been published and is available at ACI Bookstore at this convention – kudos to Jimmy Kim for coordinating the SP effort.

7) **Bridge Committee interaction:**

The committee encourages interaction with other committees**.** Several members of 345 are also members of other bridge committees. The committees and 345 contacts are listed below. Chair Brown will contact the Chairs of 364, 515, 548 and 562 and ask for a brief update on the committees activities.

   a) TAC – Mike Sprinkel – a new Technical Committee Manual (TCM) has been issued which combines Style Manual and includes guidance for specification documents and other technical information; improvements have been made to the ACI committee

website, including a committee projects feature and the ability to download rosters in Excel. TAC Chairman David Lange will discuss virtual meetings and procedures for phone meetings during conventions.

b) 222 – Corrosion – Mike Brown reported the committee is re-ballotting its main document

c) 342 – Bridge Evaluation – Jeff Smith reported a previous ballot on the 342 Load Rating document; the committee resolved negatives in Tampa.

d) 228 – NDE – Jeff Smith noted a joint session with 342 is planned for the Cincinnati convention; 9 papers submitted to date, ranging from acoustic echo to ground penetrating radar, and some case studies. They intend to publish an SP.

e) 343 – Bridge Design – Rita Oglesby reported the main committee document, 343-95R, is in the process of a major revision.

5) Status of Documents:

a) 345R – Guide for Concrete Bridge Construction

Results of ballot: 10-affirmative, 1-affirmative with comments, 2 not returned, 0 negative
ACTION: No negatives to resolve. Chair Brown will submit tabulated response with balloted revisions to TAC.

1) Jesse Beaver submitted comments – committee reviewed Jesse's comments and took appropriate actions - see attachment.

2) Need updated pictures for final document:

3.1 Transverse cracking – Mike Sprinkel

3.11 Diagonal cracking – Jeff Smith

4.1 Surface scaling – Jeff Smith

5.1 Surface spalling – Andy Foden

6.5 Longitudinal Float – Oliver Gepraegs

6.6 Longitudinal Screed – Oliver Gepraegs

6.7 Longitudinal Screed – Oliver Gepraegs

6.10 Transverse Screed – *volunteers?*

b) 345.1R – Maintenance of Concrete Bridge Elements, published July 2006. The document is scheduled for revision/re-approval in 2014.

ACTION: None at this time

c) 345.XR Guide for Concrete Bridge Deck Repair and Rehabilitation, New Document

Chapter	Title	Assigned to:	Target Completion Date
1	Introduction and scope	Brown	Develop after others
2	Notations and definitions	Brown	Develop after others
3	Condition evaluation and method selection	St. John /Smith	Not set
4	Material and method selection	Weyers /St. John	Not set
5	Removal methods	Williams	June 15, 2010 – *Drafted*

6	Repair methods	St. John /Kim	July 15, 2010 – *Section of chapter drafted*
7	Overlays	Sprinkel /Silfwerbrand	September 1, 2010
8	Electrochemical methods: CP and ECE	Brown	June 15, 2010
9	Appurtenances, joints, and parapets	Akbari	Not set

ACTION:

List of chapters and assignments:
Outline – a comprehensive outline was attached to minutes from Pittsburgh meeting, updated herein (see attachments)
Chapter 1 – Brown to draft after other chapters
Chapter 2 – Brown to draft after other chapters
Chapter 3 – St. John to draft - by August 31 – Sept 10, 2011 ballot
Chapter 4 – Weyers to draft – Brown to check status
Chapter 5 – to be balloted in May
Chapter 6 – Needs additional sections drafted (St. John & Kim)
Chapter 7 – Sprinkel to draft – by Sept 30
Chapter 8 – Brown to draft – by July 31 – Aug 10, 2011 ballot
Chapter 9 – Akbari – Chair received no response from Akbari

9.2 – Parapets – Andy Foden

9.3 – Joints – Chris Carroll

9.4 – Approach slabs – Mark Williams

1) Begin balloting individual chapters.

   Tentative order:
   a) Chapter 5
   b) Chapter 8
   c) Chapter 6
2) Chair Brown will poll Chapters 3, 4, 7 and 9 lead authors for completion date.
3) Detailed outline with updated assignments attached to minutes.

d) 345.2R – Guide for Widening of Highway Bridges, updated and approved in 1998, re-approved in 2005.

Second ballot of revisions to first ballot issued and completed just prior to Pittsburgh convention. Revisions completed by Jan 2011 and document submitted for TAC review.

Michael Brown & Mark Williams attended TAC document review on Sunday, April 3, 2011

18 reviewers – 193 comments, 14 pages of which are suggested ACI official definitions

ACTION:

TAC requests it be slightly revised to flow better, need better design details and substructure augmentation. Mark Williams and Jimmy Kim will spearhead revisions.

We need updated photos. See Figures below to see current illustrations. If you have any high-quality, more current replacement photos, please email them to Chair Brown and copy Secretary Oglesby. Thanks.

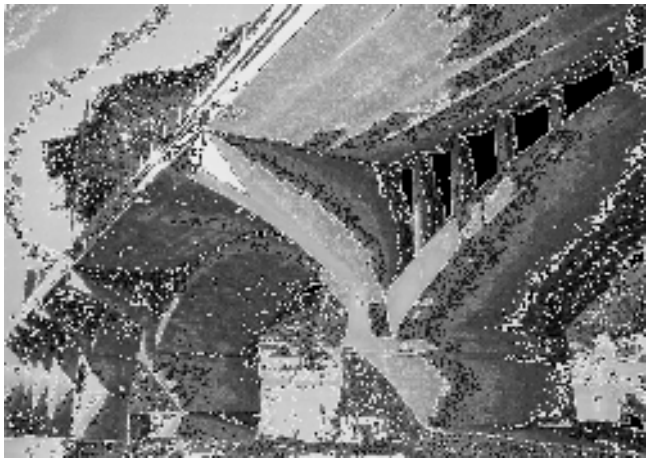

Fig. 2.1—Concrete arch widening with prestressed sections.

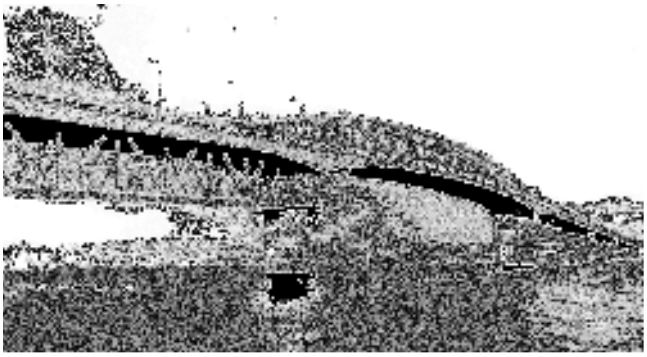

Fig. 2.2—Widened bridge with steel box girders, Auckland Harbor in New Zealand.

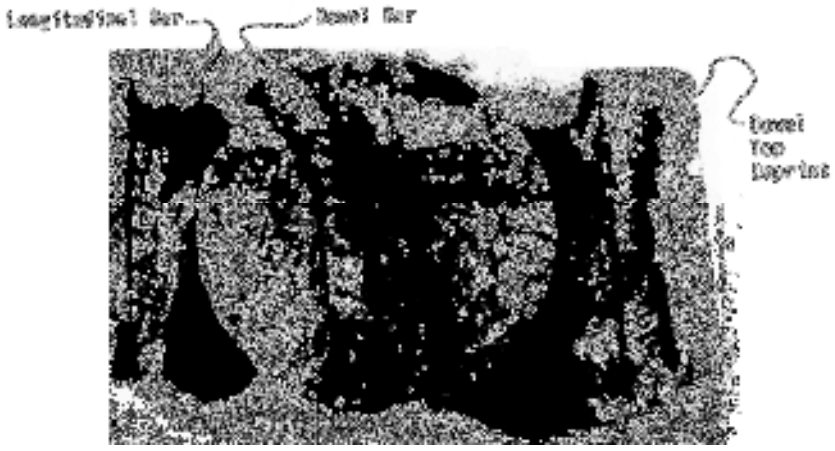

Fig. 2.4—Voids created by 90-degree hook dowel bars.

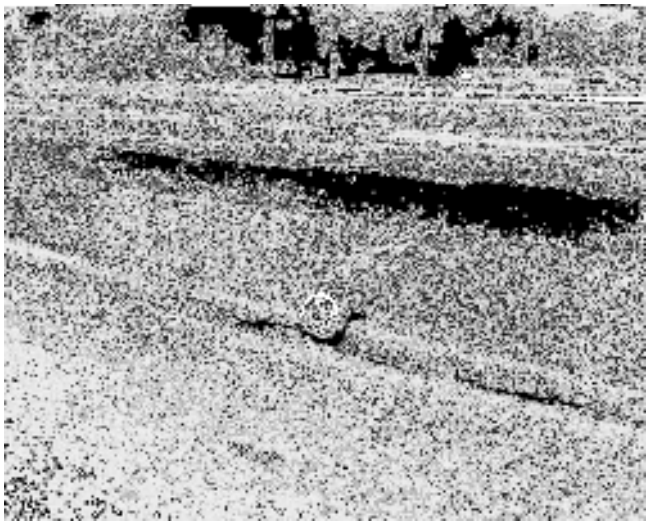

Fig.2.6—Transverse view showing vertical lip at longitudinal joint in traveled lane

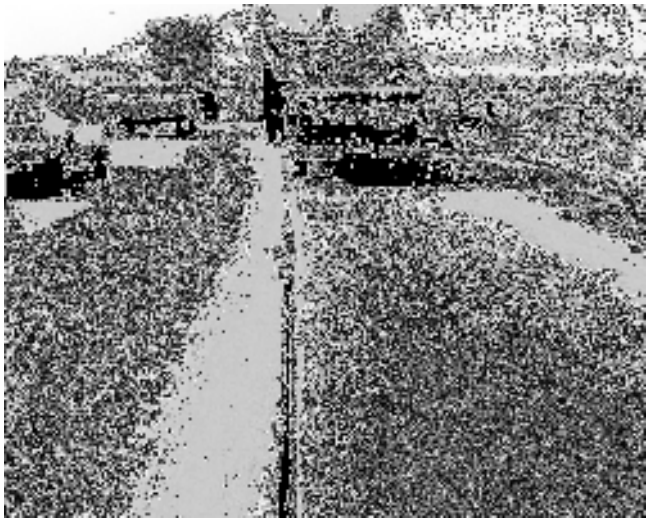

Fig. 2.7—Longitudinal view showing proximity of wheel path to joint.

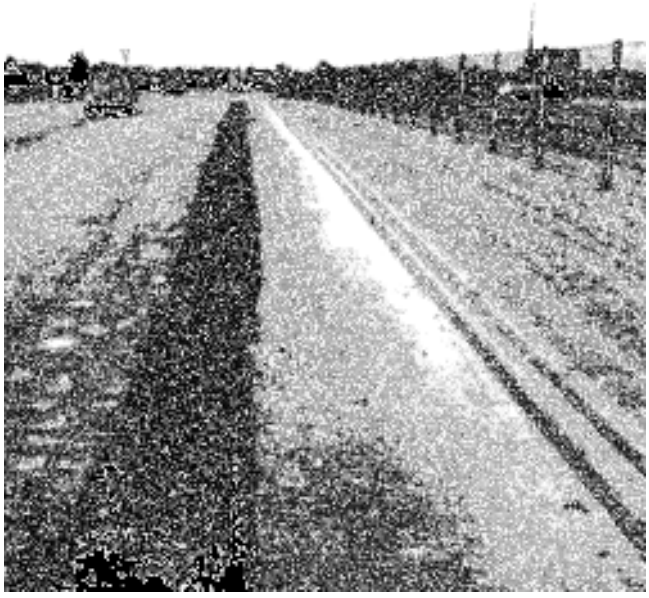

Fig. 2.8—Attempt to minimize differential deflections by means of a continuous bituminous wedge.

Fig. 2.9—Corrosion related damage under leaking longitudinal deck joint.

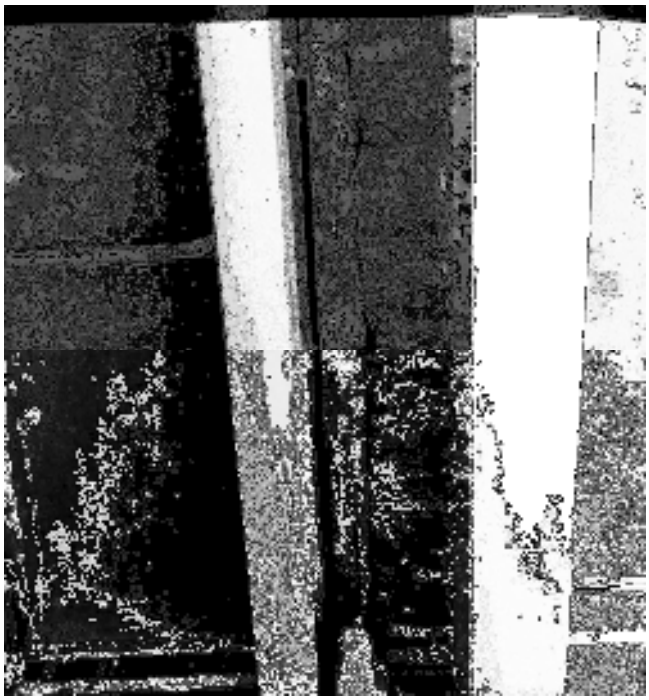

Fig. 2.10—Deck soffit spalls under reinforcing steel dowels.

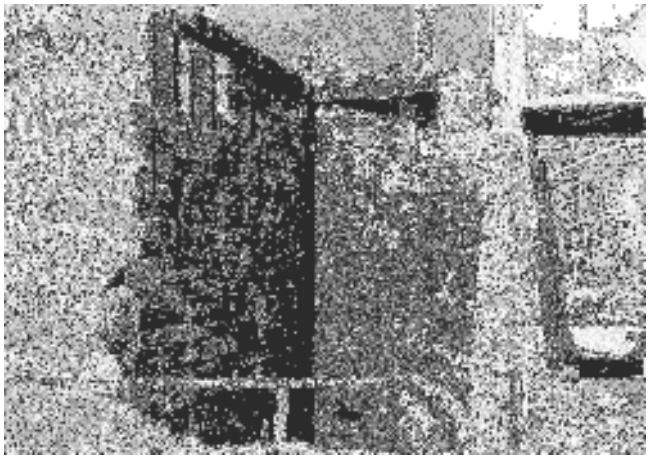

Fig. 3.1—Shoring to protect roadway during abutment widening.

Fig. 3.2—Area under old rail prepared for refinishing.

Fig. 3.3—Deck refinishing complete with concrete overlay in place.

Timeline: in TAC's hand for final by Spring 2011

6) Adjournment: The meeting was adjourned at 3:32 pm.

Respectfully submitted,
Rita K. Oglesby
Secretary 345

Attachment to Minutes – 345.X

Detailed Outline for

345.X GUIDE TO CONCRETE BRIDGE DECK REPAIR AND REHABILITATION

Chapter 1 – Introduction (*Brown*)

1.1 Purpose and Scope

Includes activities normally considered as requiring repair and rehabilitation. Excluded are maintenance activities such as deck cleaning and concrete sealer applications.

Includes:

a) crack repair
b) pothole repair
c) restoration of skid resistance
d) overlays

Chapter 2 – Notations and Definitions (Brown)

Chapter 3 – Condition Evaluation (*Paul St. John & Jeff Smith*)

3.1 Overview

3.1.1 Deterioration Processes and Mechanisms
3.1.2 Repair vs Rehabilitation

3.2 Documentation Review

3.3 Field Survey Techniques

3.3.1 Visual Examination of Bridge Deck
3.3.2 Conventional Delamination Detection
3.3.2.1 Chain Drag
3.3.2.2 Hammer Sounding
3.3.3 Electrochemical Testing
3.3.3.1 Electrical Half-Cell Potential Survey (ASTM C 876)
3.3.3.2 Corrosion Rate Evaluation
3.3.3.2.1 Linear Polarization
a) Unguarded electrode
b) Guarded electrode
3.3.3.2.2 Potentiostatic Electrochemical Impedance Spectroscopy
3.3.4 Resistance and Resistivity
3.3.4.1 2-point Direct-Path Resistance
3.3.4.2 2-point Probe Resistivity
3.3.4.3 4-point Wenner Array
3.3.5 Physical Sampling
3.3.5.1 Coring
3.3.5.1.1 Compressive and Tensile Strength & Modulus
3.3.5.1.2 Petrographic Evaluation
a) Aggregate Type/Condition
b) Cement Paste Quality
c) Air Entrainment
d) Deleterious Reactions (ASR, Carbonation, DEF, Sulfate Attack)
e) Construction quality (freezing/thawing damage, over-finishing, honeycombing, cold joints)
f) Presence of pozzolans or mineral admixtures
g) Presence of surface treatments/penetrating sealers
3.3.5.2 Drilling/Concrete Powder Sampling
3.3.6 Chloride Concentration Testing
3.3.6.1 Acid-soluble Chloride Titration

3.3.6.2 Water-soluble Chloride Titration
3.3.6.3 Rapid Chloride Test using Calibrated Ion-Selective Electrode
3.3.6.4 X-ray Defraction technique
3.3.6.5 Chloride Profiling and Diffusion Modeling
3.3.7 Non-Destructive Evaluation Methods
3.3.7.1 Infrared Thermography
3.3.7.2 Ground Penetrating Radar
3.3.7.3 Sonic Methods - Impact Echo
3.3.7.4 Ultrasonic Methods and Surface Wave Methods

Chapter 4 – Material and Method Selection (*Weyers & St. John*)

4.1 Overview

4.2 Materials

4.2.1 Crack repair
4.2.1.1 Gravity systems – MMA
4.2.1.2 Pressurized systems – epoxy
4.2.2 Pothole Repair
4.2.2.1 Types of Rapid Systems
4.2.2.1.1 Temporary
4.2.2.1.2 Permanent
4.2.2.2 Polymer Systems
4.2.2.2.1 Pre-packaged systems
4.2.2.2.2 Proportioned systems
4.2.2.3 Asphalt Concrete
4.2.2.4 Rapid Strength Gain Systems – concrete
4.2.3 Skid Resistance
4.2.3.1 Polymer concrete overlays
4.2.3.2 Grooving
4.2.4 Overlays
4.2.4.1 Polymer Concrete Overlays
4.2.4.2 Asphalt Overlays
4.2.4.2.1 Without Membrane
4.2.4.2.2 With Membrane
4.2.4.3 Concrete Overlays
4.2.4.3.1 Rapid Strength Gain Concrete
4.2.4.3.2 Latex Modified Concrete
4.2.4.3.3 Low-slump Dense Concrete
4.2.4.3.4 Microsilica Concrete

4.3 Methods

4.3.1 Criteria
Remaining service life required:
a) Time of repair to rehabilitation
b) Rehabilitation to replacement
4.3.2 Performance Aspects
4.3.2.1 Service Life
4.3.2.2 Costs
4.3.2.3 Traffic Conditions
4.3.2.4 Weather Conditions
4.3.3 Specifications and Testing of Systems

Chapter 5 – Removal Methods and Surface Preparation (*Williams*)

5.1 Overview

In addition to project-specific requirements, method selection must also be guided by the following principles of sound practice:

1) The structure to be coated should not be damaged.
2) Reinforcing steel should not be damaged nor its bond with the concrete loosened.

3)Vibration, impact, or thermal loads applied should not weaken the concrete.

5.2 Method Overview (Present in order from least to most aggressive)

5.2.1 Low-Pressure Water Cleaning (Cleaning Method)
5.2.2 Grinding (Erosion Method)
5.2.3 Abrasive Blasting (Pulverizing Method)
5.2.4 Steel Shotblasting (Pulverizing Method)
5.2.5 Scarifying (Impact Method)
5.2.6 Needle Scaling (Impact Method)
5.2.7 High and Ultra High.Pressure Water Jetting (Erosion Method)
5.2.8 Scabbling (Impact Method) – too much risk of micro-cracking?
5.2.9 Flame Blasting (Expansion Method)
5.2.10 Milling (Impact Method) – too much risk of micro-cracking?
5.2.11 Full Depth Removal – Saw cut, chipping hammers

5.3 Method Selection Process – Reduce risk of micro-cracking

5.4 Summary/Conclusions

Chapter 6 – Repair Methods (*St. John/Kim)*

6.1 Overview

6.1.1 Reasons for Repair
a) Loss of Concrete Section or Cover
b) Loss of Steel Reinforcement Section
c) Loss of Ride Quality or Skid Resistance
d) Impact Damage

6.1.2 Types of Repair
a) Patching
b) Crack Repair
c) Overlay

6.2 Standard Repairs

6.2.1 Patching
6.2.2.1 Partial Depth
6.2.2.2 Full-Depth

6.2.2 Crack Repair
6.2.2.1 Gravity Fill Methods
a) Rout and Seal
b) Flood coat
6.2.2.2 Pressure Methods
a) Epoxy Injection

6.2.3 Joint Repairs
6.2.3.1 Joint Types
6.2.3.2 Surface Preparation
6.2.3.3 Joint anchorage repair or replacement

6.3 Repairs with Advanced Composites

6.3.1 Steel-Reinforced Polymers
6.3.2 Fiber-Reinforced Polymers
6.3.3 Fiber-Reinforced Concrete

Chapter 7 – Overlays (*Sprinkel & Silfwerbrand*)

7.1 Scope

7.2 Need for Overlays

7.2.1 Waterproof Barrier
7.2.2 Skid Resistance
7.2.3 Wearing Course
7.2.4 Reduction of Wheel Load Effect

7.3 Required Properties of Overlays

7.3.1 Properties required of all overlays
7.3.1.1 Adhesion to concrete

7.3.1.2 Cohesion
7.3.1.3 Skid Resistance
7.3.1.4 Durability
7.3.2 Properties required of waterproof barriers
7.3.2.1 Impermeability
7.3.2.2 Crack Resistance
7.3.2.3 Temperature Compatibility

7.4 Types of Overlays
7.4.1 Latex Modified Concrete Overlays
7.4.2 Hydraulic Cement Concrete Overlays
7.4.3 Polymer Overlays
7.4.4 Membrane and AC Overlays

7.5 Design Considerations

7.6 Construction Considerations
7.6.1 Constructing the Overlay
7.6.1.1 Scarification and Removal of Unsound Concrete
7.6.1.2 Substrate Preparation
7.6.1.3 Placement and Consolidation
7.6.1.4 Curing
7.6.1.5 Skid Resistance

7.7 Other Considerations
7.7.1 Material Performance Specifications
7.7.1.1 Cement Type
7.7.1.2 Maximum w/cm
7.7.1.3 Maximum Aggregate Size
7.7.1.4 Maximum Air Content
7.7.1.5 Slump
7.7.1.6 Minimum Compressive Strength

Chapter 8 – Electrochemical Methods (*Brown*)

8.1 Overview of reinforcement corrosion causes and processes (ACI 222R?)
8.1.1 Influence of OH^- and pH
8.1.2 Influence of chloride
8.1.3 Other factors

8.2 Electrochemical testing for corrosion
8.2.1 Corrosion potential
8.2.1.1 Methods
8.2.1.2 Limitations and constraints
8.2.2 Corrosion rate
8.2.2.1 Methods
a) Linear Polarization
b) Electrochemical Impedance Spectroscopy
8.2.2.2 Limitations and constraints
8.2.3 Resistivity

8.3 Electrochemical Treatment Processes
8.3.1 Impressed Current Applications
8.3.1.1 Cathodic Protection and Prevention (NACE RP0290-2000)
8.3.1.1.1 Methods
a) Overlays containing Strip or Mesh Anodes
b) Conductive Coatings
8.3.1.1.2 Limitations and Constraints
8.3.1.2 Electrochemical Chloride Extraction (NACE 01101)
8.3.1.3 Re-alkalization
8.3.2 Galvanic Applications
8.3.2.1 Cathodic Protection and Prevention

8.3.2.1.1 Methods
a) Galvanic Coatings
b) Bulk Anodes and Distributed Anodes
8.3.2.1.2 Limitations and Constraints

Chapter 9 – Appurtenances, Joints, Parapets and Approach Slabs (*Akbari)*

9.1 Sidewalks

9.1.1 Introduction to Concrete Sidewalks
9.1.2 Types of Loads/Stresses Acting on Sidewalks
9.1.3 Possible Damages of Concrete Sidewalks
9.1.3.1 Concrete Problems (Deterioration, Cracking, Abrasion, Corrosion, Water Leakage, Delamination, Surface Smoothing, Freeze-Thaw, Disintegration, etc.)
9.1.3.2 Damage Due to Moving/Static Loads of Heavy Vehicles
9.1.3.3 Fracture or Settlements in Sidewalks with Hollow Like Section
9.1.3.4 Load Effects to Cantilevered Sidewalks
9.1.3.5 Other Damages
9.1.4 Repair, Rehabilitation or Strengthening Techniques
9.1.5 Stress Reduction Techniques
9.1.6 Reinforcement Requirements
9.1.7 Surface Preparation
9.1.8 Overlays and Coatings
9.1.9 Placements Methods

9.2 Parapets *(Foden)*

9.2.1 Introduction to Concrete/Steel Parapets
9.2.2 Types of Loads/Stresses Acting on Parapets
9.2.3 Possible Damages of Parapets
9.2.3.1 Concrete Problems (Deterioration, Cracking, Corrosion, Water Leakage, Delamination, Freeze-Thaw, Disintegration, etc.)
9.2.3.2 Damage Due to Impact Effects of Moving Vehicles
9.2.3.3 Steel.Concrete Connections
9.2.3.4 Other Damages
9.2.4 Reinforcement Requirements
9.2.5 Repair, Rehabilitation or Strengthening Techniques

9.3 Joints *(Carroll)*

9.3.1 Bridge Deck Joints Classification
9.3.2 Expansion/Non-Expansion Joint Functions
9.3.3 Traffic Bearing Expansion Joints
9.3.4 Other Types and Features
9.3.5 Review of Current Practice
9.3.5.1 Design Procedures
9.3.5.2 Construction Practice
9.3.5.3 Selection Guidelines
9.3.6 Possible Problems with Bridge Deck Joints
9.3.7 Deck Joints Maintenance, Repair and Rehabilitation Practice
9.3.8 Deck Joints Waterproofing and Sealing
9.3.9 Lessons for Maximizing Joint Service Life

9.4 Approach Slabs *(Williams)*

9.4.1 Introduction to Approach Slabs
9.4.2 Types and Features
9.4.3 Reinforcement Requirements
9.4.4 Seismic Effects to Approach Slabs
9.4.5 Possible Damages for Approach Slabs
9.4.6 Settlement in Approach Slabs and Abutment Backfill
9.4.7 Repair and Rehabilitation of Approach Slabs

Related Committees/Documents
201 – Durability
222 – Corrosion of Metals in Concrete
546 – Repair of Concrete
364 – Rehabilitation
365 – Service Life

References:
NCHRP 4 ;
AASHTO-AGC-ARTBA Joint Committee Task Force 3G Report "Guide Specifications for Concrete Overlays of Pavements and Bridge Decks";
NYSDOT Bridge Deck Evaluation Manual;
NYSDOT Materials Bureau "Field Survey Manual for Bridge Deck Overlay Projects"

ASTM - LCCA
RILEM
NCHRP – Service Life Prediction Report
NACE – R/C Condition Evaluation
ICRI Guide 03732 *(provides an extensive coverage of concrete removal methods)*

Attachment to Minutes – 345R TAC Response
Addressing of Ballot Comments

Electronic Comments for TAC Review

Name: 345R Response to TAC Comments					Committee: 345 Bridge Construction	
Document #: 345R – Full Doc		TAC Agenda #:			Date: 4/11/2011	
Initials	**Ballot #**	**Pg #**	**Ln #**	**P/E/S**	**Comment**	**Resolution**
JLB		9	6-7	E	Why is overlay the recommended default? We find that use of a crack-resistant concrete mix with additional sacrificial thickness is faster and cheaper to construct. We include capacity for a future overlay in the bridge design to allow rehab ~30-40 years in the future.	Non-persuasive; other options are permitted with current language. It is an example.
JLB		9	9	E	Is this the correct place to discuss consideration of a post-tensioned deck as option to prevent tension?	Inserted "may" include
JLB		14	19	E	Delete words “a real site”	Change made
JLB		14	21	E	Corrugated metal stay-in-place forms are recommended for radial structures. We have found them to be potential detrimental when combined with the typical deck cracking by water entrapment and prevention of future deck soffit inspection.	New business
JLB		15	12	E	We have had instances where the geometry of the vertical curve & cross-slope combine to result in excessively deep haunches over the girder top flange away from the bearings and have had to add reinforcement in these areas, typically for depths exceeding approx. 5 inches. It may be appropriate to mention here.	New business
JLB		19	17	E	2nd paragraph under 3.7.8 appears to be part of the opening language under 3.7 and if so, is not placed in the correct location.	Agree
JLB		22	9	E	Replace term “recent” with “2003”	Deleted "recent"

Name: 345R Response to TAC Comments					Committee: 345 Bridge Construction	
Document #: 345R – Full Doc		TAC Agenda #:			Date: 4/11/2011	
Initials	**Ballot #**	**Pg #**	**Ln #**	**P/E/S**	**Comment**	**Resolution**
JLB		27	6	E	Statements describing adoption levels in 1993 are not useful. Recommend deleting these 2 sentences and proceeding with the list of states that have adopted C1157.	Stands as written; time is stated to make a point about slow pace of adoption.
JLB		34	1-2	E	Fragmented sentence	fixed
JLB		34	9	E	Run-on sentence; recommend ending after resistance	fixed
JLB		34	15	E	Past performance is a poor general method for aggregate acceptance; recommend removing entirely and replacing with test standards. Feedback from service of aggregates is not typically provided to materials specification writers.	This is not a stated recommendation, but a reflection of actual practice. Standards are referenced in preceding paragraph.
JLB		35	1-3	E	Prohibition on seawater/brackish water should be linked to use of ferrous reinforcement. This would be OK, and potentially beneficial to the concrete, when used with alternative reinforcements such as FRP.	New business; seawater may affect more than just ferrous reinforcement.
JLB		42	2	E	WSDOT has published a research report that implicates Class F fly ash as a significant contributor to shrinkage induced cracking (http://www.wsdot.wa.gov/research/reports/fullreports/747.1.pdf). We have also noticed the large increase in fly ash use correlates with the initial occurrences of deck cracking. A recent experimental field installation of a deck with shrinkage reducing admix (SRA) has yielded our first uncracked deck since addition of fly ash to the deck concrete mixes. I recommend discussing the impact of delayed strength gain from fly ash and its correlation with consequent increased shrinkage cracking.	New Business
JLB		44	9	E	This section neglects any discussion of ACI standards/guides relates to ASR or AAR such as ACI 221.1R-98(08)	Add reference

Name: 345R Response to TAC Comments					Committee: 345 Bridge Construction	
Document #: 345R – Full Doc		TAC Agenda #:			Date: 4/11/2011	
Initials	**Ballot #**	**Pg #**	**Ln #**	**P/E/S**	**Comment**	**Resolution**
JLB		45	4	E	Skid resistance measures discuss only those that are performed to the fresh concrete, all of which are found to delay application of wet cure. This section should discuss diamond-grooving or sawcutting after wet cure as options to get the skid resistance.	Discussed on p. 76
JLB		46	1	E	Rebar is specified as A615, but excludes A706, which is our default rebar. The superior bending properties are beneficial for many applications with bridge decks such as access for future widenings.	Reference added
JLB		49	1-4	E	(1) Many screeds do not use 'float boards'; (2) Not sure how to employ the block of wood attached to both the float board and the rebar; (3) method 3 could be referred to as finishing machine 'dry run'	Add "dry-run".
JLB		60	9	E	Add word "high" before "wind speed"	Added "high"
JLB		60	10	E	Change "causing" to "cause"	Changed to "cause"
JLB		62	22	E	Extra period at sentence end.	Deleted
JLB		67	8	E	Reference to AASHTO LRFD is out of date; suggest removing date.	Date removed
JLB		67	9	E	Recommend changing the order of machine strike-off and vibratory consolidation in this sentence.	OK
JLB		76	2	E	Please add diamond grooving to the texture methods; WA state is using this method after completion of wet cure.	No action
JLB		76	4	E	Please discuss texturing after cure; this sequencing allows application of wet cure to the fresh wet concrete before early water loss.	Added "after curing"

Name: 345R Response to TAC Comments					Committee: 345 Bridge Construction	
Document #: 345R – Full Doc		TAC Agenda #:			Date: 4/11/2011	
Initials	**Ballot #**	**Pg #**	**Ln #**	**P/E/S**	**Comment**	**Resolution**
JLB		83	22	E	Cure period of 7 days is short for the high performance concretes used in bridge decks. This may not give hydration adequate to provide desired permeability characteristics. WA state and many others specify 14 days.	No change, statement says "minimum", and does not prevent longer curing periods
JLB		84	15	E	The discussion indicates that cracking is basically the result of poor cure practices. This has recently been shown to be false or only partially true. The best conceivable curing cannot stop cracking in current DOT specified deck mix designs. The early cracking is more often the result of poor mix designs with too much cement, fly ash, and aggregate that is too small. WA state had a recent contract with reduced cement content, resulting from the research at (http://www.wsdot.wa.gov/research/reports/fullreports/747.1.pdf) that had a deck with **no** cracking.	New business
Non-voting Member Comments						
DKH		0	0	S	…from the TAC comments document there are no committee responses for the following: 22, 116, 121, and 175.	These were editorial changes and were addressed. Table updated.
WRN		5	12	E	suggest to delete the word 'qualities '-- insert the word 'properties'	"ride quality" is a common term when discussing pavement smoothness.
WRN		5	13	E	suggest to delete the word 'qualities' and insert the word 'Attributes '	"ride quality" is a common term when discussing pavement smoothness.
WRN		0	0	E	the photos are dated and do not show workers in hardhats, PPE 6.5,6.6.6.7 and 6.10	Agreed. A call has been issued for updated photos.

(P - Primary), (E – Editorial), (M - Marked Copy), or (S – Secondary)
(Add "P" to P/E/S – Add "0" to Pg# and "0" to Ln#, making it a General Comment)