

# PROGRAM



63rd ANNUAL  
CONVENTION



*In Toronto, Ontario, Canada*



CANADA'S 100th YEAR of CONFEDERATION

AMERICAN  
CONCRETE  
INSTITUTE

April 1-7, 1967

***ROYAL YORK HOTEL***

Toronto, Ontario, Canada

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### \* Address

**AMERICAN CONCRETE INSTITUTE**

P. O. Box 4754

Detroit, Michigan 48219

## - CONVENTION REGISTRATION -

Special Registration,

Sunday, April 2 . . . . . 2:00 to 5:00 p.m.

Registration, April 3-6 . . . . . 8:00 a.m. to 6:00 p.m.

Registration, April 7 . . . . . 8:00 a.m. to 2:00 p.m.

Registration fee of \$10.00 payable at the registration desk in the Convention Floor lobby, Royal York Hotel.

Registered members and non-members as well as the ladies are invited to attend the various technical sessions, symposia, social activities, and the ACI men-of-the-year Awards Luncheon.

PLEASE WATCH FOR SPECIAL ANNOUNCEMENTS DAILY ON THE BULLETIN BOARD NEAR THE REGISTRATION DESK.

### \* \* \* SPECIAL EVENTS \* \* \*

**Technical-Educational Exhibits** . . . Tuesday through Thursday in Ballroom A, on the Convention Floor. Have your program card (inside back flap) stamped completely to qualify for valuable door prizes.

### Events Sponsored by the Local Committee:

\* **Tuesday**, April 4—Cocktail Hour, 6:30 p.m. in the Concert Hall. "A Toast to Canada's 100th Birthday." Compliments of the local committee. Please wear your badge.

\* **Wednesday**, April 5—CENTENNIAL DINNER . . . Leave hotel from the Front Street exit on special buses at 5:30 p.m. for the Queen Elizabeth Building at the Canadian National Exhibition grounds. Two classes of tickets will be available for sale at the Registration Desk. One class, limited to 200 persons, includes a visit to the Ontario Hydro Research Laboratory. The other is for those returning at 7:30 p.m. for the Royal York and the evening session of the International Bridge Symposium. Make sure you get the right ticket.

\* **Friday**, April 7—Montreal and the site of Expo '67 . . . Provided there is sufficient demand, this inspection trip will begin from the Union Station (across from the Royal York) at 4:45 p.m. Check for details and hotel and train reservations at the Registration Desk.

Special Events Cont'd

## Special Events Cont'd

**National Research Council Symposium Luncheon** — Friday, April 7, at 12:00 noon in the Ontario Room. This luncheon is a part of the Concrete Performance Symposium — a symposium held in honor of the late Dr. T. Thorvaldson — sponsored by the Division of Building Research, National Research Council of Canada. Tickets \$10.00 per person. This \$10.00 luncheon fee covers the cost of the luncheon and an advance copy of the symposium proceedings published by the NRC. (After the convention) this volume will sell for \$10.00.)

★

**Architectural Design Competition** . . . Winning sketches and honorable mention entries on display beginning Tuesday.

★

**Photo Display** . . . 15 panels containing photos of unusual and outstanding concrete structures from all over the world. Monday through Friday.

★

**Awards Luncheon and Installation of New ACI Officers** . . . 12:30 p.m., Thursday in the Concert Hall. One may purchase tickets up to 2:00 p.m., Wednesday at the Registration Desk. \$4.00 per person.

★

**University of Illinois Alumni Breakfast** . . . 7:15 a.m., Wednesday, in Room #3. Tickets are available from alumni and University of Illinois staff members. \$2.75 per person.

★

**PCA Alumni Association** . . . Thursday, April 6, 5:00 p.m. to 7:00 p.m. in the Saskatchewan Room.

★

**Ladies Program** . . . see the daily schedule on page 25.

★

**ACI Headquarters** . . . . . **Room B**

## BREAKFASTS

**Monday**, April 3, 7:30 a.m. — Quebec Room — New chairmen of technical committees (by invitation)

**Tuesday**, April 4, 7:30 a.m.—Manitoba Room—Program participants in International Symposium on Concrete Bridge Design (by invitation)

**Wednesday**, April 5, 7:30 a.m.—Manitoba Room — Program participants in two Research Sessions sponsored by Committee 115 (by invitation)

**Thursday**, April 6, 7:30 a.m.—Nova Scotia Room — Program participants in General Session, Construction Session, Design/Analysis Session (by invitation)

**Friday**, April 7, 7:30 a.m. — Nova Scotia Room — Special technical committee chairmen breakfast (by invitation)

★

## TECHNICAL COMMITTEE MEETINGS

Meeting topics are in italics. Be sure to check the bulletin board for last-minute changes or added meetings.

**SUNDAY, April 2**

**2:00 p.m. - 5:00 p.m.**

### COMMITTEE

### Meeting Room

213 Lightweight Aggregate Concrete  
*(Recommended Practice and Research)*

Algonquin

**SUNDAY, April 2**

**7:30 p.m.**

213 Subcommittee 4 of Committee 213,  
Lightweight Aggregate Concrete  
*(Research)*

Algonquin

MONDAY, April 3

9:00 a.m. - 12:00 noon

COMMITTEE	Meeting Room
Ad Hoc Committee on Effect of Temperature on Concrete ( <i>Symposium program</i> )	Library
318 Subcommittee 4 of Committee 318, Standard Building Code - Materials ( <i>Proposed revisions</i> )	York
318 Subcommittee 9 of Committee 318, Standard Building Code - General Design ( <i>Proposed revisions</i> )	Newfoundland
344 Circular Prestressed Concrete Structures ( <i>Draft report</i> )	British Columbia
350 Sanitary Engineering Structures ( <i>Draft report</i> )	10 & 11
426 Shear and Diagonal Tension - Joint ACI-ASCE ( <i>Research and recommendations</i> )	Algonquin
435 Deflection of Concrete Building Structures ( <i>Subcommittee reports</i> )	Saskatchewan
437 Strength Evaluation of Existing Concrete Structures ( <i>Subcommittee reports</i> )	Nova Scotia
438 Torsion ( <i>Code requirements</i> )	Board Room (20th Floor)
512 Precast Structural Concrete - Joint ACI-ASCE ( <i>Recommended practices</i> )	Manitoba
533 Precast Panels ( <i>Proposed standard</i> )	Territories
543 Concrete Piles ( <i>Draft report</i> )	New Brunswick

2:00 p.m. - 5:00 p.m.

207 Mass Concrete ( <i>Draft report</i> )	9
316 Construction of Concrete Pavements and Concrete Bases ( <i>Revision of Standard ACI 617-58</i> )	York
318 Standard Building Code ( <i>Subcommittee reports</i> )	Territories

MONDAY, April 3

2:00 p.m. - 5:00 p.m. (Continued)

COMMITTEE	Meeting Room
336 Combined Footings and Pier Foundations ( <i>Pier foundations</i> )	Library
344 Circular Prestressed Concrete Structures ( <i>Continuation of morning session</i> )	British Columbia
350 Sanitary Engineering Structures ( <i>Continuation of morning session</i> )	10 & 11
428 Limit Design ( <i>Code recommendations</i> )	Manitoba
437 Strength Evaluation of Existing Concrete Structures ( <i>Continuation of morning session</i> )	Nova Scotia
438 Torsion ( <i>Continuation of morning session</i> )	Board Room (20th floor)
443 Concrete Bridge Design ( <i>Subcommittee reports and draft report</i> )	Algonquin
523 Insulating and Cellular Concretes ( <i>Draft guide</i> )	Saskatchewan
531 Concrete Masonry Structures ( <i>Subcommittee reports</i> )	7 & 8
543 Concrete Piles ( <i>Continuation of morning session</i> )	New Brunswick

7:30 p.m.

318 Subcommittee 20 of Committee 318 Standard Building Code - Slabs	Saskatchewan
428 Limit Design ( <i>Continuation of afternoon session</i> )	Manitoba
439 High Strength Reinforcement in Concrete ( <i>Design guides</i> )	Quebec
443 Subcommittees of Concrete Bridge Design ( <i>Continuation of afternoon session</i> )	Algonquin

TUESDAY, April 4

9:00 a.m. - 12:00 noon

COMMITTEE	Meeting Room
116 Nomenclature ( <i>Final draft and glossary</i> )	Newfoundland
118 Use of Computers ( <i>Practice and future work</i> )	Library
201 Durability of Concrete ( <i>Survey of structure performance</i> )	Manitoba
224 Cracking ( <i>Research in progress</i> )	Saskatchewan
309 Consolidation of Concrete ( <i>Revision of 1960 report</i> )	Alberta
315 Detailing Reinforced Concrete Structures ( <i>Revision of manual</i> )	4
318 Subcommittee 12 of Committee 318, Standard Building Code - Shear ( <i>Proposed revisions</i> )	5
325 Structural Design of Concrete Pavements for Highways and Airports ( <i>Subcommittee reports</i> )	New Brunswick
340 Ultimate Strength Design Handbook	Nova Scotia
344 Circular Prestressed Concrete Structures ( <i>Draft report</i> )	British Columbia
348 Structural Safety	Territories
408 Bond Stress ( <i>Code revisions</i> )	Quebec
421 Reinforced Concrete Slabs — Joint ACI-ASCE ( <i>Design method</i> )	Metropolitan
443 <b>Subcommittees of Concrete Bridge Design</b> ( <i>Subcommittee reports and draft report</i> )	Algonquin

TUESDAY, April 4

2:00 p.m. - 5:00 p.m.

COMMITTEE	Meeting Room
104 Notation	Newfoundland
118 Use of Computers ( <i>Continuation of morning session</i> )	Library
209 Creep and Shrinkage in Concrete ( <i>Design methods</i> )	5
215 Fatigue of Concrete ( <i>Research proposals</i> )	4
222 Corrosion of Metals in Concrete ( <i>State-of-the-knowledge report</i> )	6
224 Cracking ( <i>Continuation of morning session</i> )	Saskatchewan
302 Concrete Floor Finishes	Nova Scotia
304 Measuring, Mixing, Transporting and Placing Concrete ( <i>Subcommittee reports</i> )	New Brunswick
305 Hot Weather Concreting ( <i>Draft report</i> )	Metropolitan
309 Consolidation of Concrete ( <i>Continuation of morning session</i> )	Alberta
318 <b>Standard Building Code</b> ( <i>Subcommittee reports</i> )	<b>Territories</b>
333 Composite Construction—Joint ACI-ASCE ( <i>Future plans</i> )	Quebec
344 Circular Prestressed Concrete Structures ( <i>Continuation of morning session</i> )	British Columbia
345 Concrete Bridge Decks ( <i>Preliminary draft report</i> )	Manitoba
443 Concrete Bridge Design ( <i>Continuation of morning session</i> )	Algonquin

WEDNESDAY, April 5

9:00 a.m. - 12:00 noon

COMMITTEE	Meeting Room
— Chapter Forum ( <i>For ACI Chapter officers and members only</i> )	4
212 Admixtures	Saskatchewan
216 Fire Resistance and Fire Protection of Structures	Library
223 Expansive Cement Concretes ( <i>Draft report</i> )	Manitoba
301 Specifications for Structural Concrete ( <i>Subcommittee reports</i> )	Nova Scotia
307 Reinforced Concrete Chimneys ( <i>Revision of ACI Standard</i> )	Newfoundland
311 Inspection of Concrete	Alberta
313 Concrete Bins and Silos ( <i>Subcommittee reports</i> )	British Columbia
408 Bond Stress ( <i>Research in progress</i> )	Quebec
516 High Pressure Steam Curing	Territories

2:00 p.m. - 5:00 p.m.

115 Research	Territories
211 Proportioning Concrete Mixes ( <i>Revision of standards</i> )	Algonquin
223 Expansive Cement Concretes ( <i>Continuation of morning session</i> )	Manitoba
308 Curing Concrete ( <i>Draft report</i> )	Alberta
313 Concrete Bins and Silos ( <i>Continuation of morning session</i> )	British Columbia
347 Formwork for Concrete ( <i>Revision of standard and manual</i> )	5
441 Concrete Columns—Joint ACI-ASCE ( <i>Code of Revisions</i> )	Quebec
442 Lateral Forces on Multistory Frames ( <i>Draft report</i> )	Library
515 Coatings for Concrete	Saskatchewan
517 Low Pressure Steam Curing ( <i>Proposed standard</i> )	Nova Scotia
524 Portland Cement Plastering ( <i>Revision of guide</i> )	New Brunswick
544 Fiber-Reinforced Concrete	York

WEDNESDAY, April 5

8:30 a.m. - 12:00 Midnight

INTERNATIONAL SYMPOSIUM ON  
CONCRETE BRIDGE DESIGN

. . . . Concert Hall

This symposium is sponsored by ACI Committee 443, Concrete Bridge Design, under the chairmanship of Professor Shu-t'ien Li. The proceedings of this symposium will be published by the American Concrete Institute in the ACI Symposia Series.

Program Chairman: Leonidas T. Delyannis, Chairman, Symposium Program Committee, Committee 443; chief bridge engineer, David Volkert & Associates, Washington, D.C.

MORNING SESSION

8:30 a.m. - 12:00 Noon

Presiding Cochairman: Shu-t'ien Li, chairman, Committee 443; professor of civil engineering, South Dakota School of Mines and Technology, Rapid City, South Dakota

**Design and Construction of Prestressed Concrete Through-Girder Railway Bridges in Japan**—Michiyuki Kohno and Yoshio Ozaka, structural engineers, Structural Design Office, Japanese National Railways, Tokyo, Japan

**The Hudson Hope Bridge—Its Post-Tensioned Box Girder Stiffening Deck and Prestressed Rock Anchors**—L. Osipov, partner, Phillips, Barratt and Partners, Vancouver, British Columbia

**Prestressed Concrete Bridge Construction with Stepping Formwork Equipment**—Hans Wittfoht, director, Polensky and Zöllner, Frankfurt am Main, Germany

**Three Span Continuous Prestressed Concrete Bridge Constructed of Precast Units in Cantilever Construction**—Arne Lundgren, Consulting Engineer, Holte, Denmark; and Frode Hansen, chief engineer, Christiani and Nielsen, Ltd., London, England

**Ultimate Design - Serviceability Investigation (A Unified Method for Reinforced Concrete Bridge Design)**—Noel J. Everard, professor of engineering mechanics, Arlington State College, Arlington, Texas

**MORNING SESSION (Continued)**

8:30 a.m. - 12:00 Noon

**Fatigue Behavior of Prestressed Concrete Bridge Beams**—Paul W. Abeles, visiting professor of civil engineering, University of Kentucky, Lexington, Kentucky; Furman W. Barton, assistant professor of civil engineering, and Earl I. Brown II, professor of civil engineering, Duke University, Durham, North Carolina

**Continuous, Post-Tensioned, Torsionally Stiff Concrete Bridges**—Krishan G. Bassi, Watone T. Lin, and Brian S. Richardson, senior designers, Bridge Division, Ontario Department of Highways, Downsview, Ontario

**Experiences from Fatigue and Rupture Tests on a Prestressed Concrete Bridge**—A. Rösli, Head of Department for Reinforced Concrete, Swiss Laboratories of Testing Materials and Research, Zurich, Switzerland

**AFTERNOON SESSION**

1:30 p.m. - 5:00 p.m.

Presiding Cochairman: Laurence Cazaly, president, Cazaly Associates, Toronto, Ontario

**Earthquake Resistant Details for Concrete Bridges**—Robert G. Lium, bridge design engineer, Sverdrup and Parcel and Associates, Inc., Bellevue, Washington

**Through-Voided Box Beams for Railway Bridge Construction**—George F. Leyh, structural engineer, Portland Cement Association, Chicago; and Freeman P. Drew, research engineer structures, Association of American Railroads, Chicago, Illinois

**Limit Design of Continuous Concrete Bridge Girders**—Kurt H. Gerstle, professor of civil engineering, University of Colorado, Boulder, Colorado; and M. Z. Cohn, professor of civil engineering, University of Waterloo, Waterloo, Ontario

**Post-Tensioned Waffle and Multispan Cantilever System Composing the Hegenberber Overpass**—T. Y. Lin, professor of civil engineering, University of California, Berkeley; Felix Kulka, president; and Y. D. Yang, vice-president, T. Y. Lin, Kulka, Yang and Associates, San Francisco, California

**AFTERNOON SESSION (Continued)**

1:30 p.m. - 5:00 p.m.

**Can High-Strength Reinforcement Be Used in Highway Bridges?**—S. D. Lash, head, Department of Civil Engineering, Queen's University, Kingston, Ontario

**Torsional Analysis of Single Thin-Walled Trapezoidal Concrete Box Girder Bridges**—David H. H. Tung, associate professor of civil engineering, Department of Civil Engineering, The Cooper Union for the Advancement of Science and Art, New York, New York

**Concrete Box Girder Bridges Analyzed as Folded Plates**—Kuang-Han Chu, professor of civil engineering, Department of Civil Engineering, Illinois Institute of Technology, Chicago, Illinois; and Elliott Dudnik, structural engineer, Skidmore, Owings and Merrill, Chicago, Illinois

**Load Distribution in Concrete Box Girder Bridges**—A. C. Scordelis, professor of civil engineering, Department of Civil Engineering, University of California, Berkeley; R. E. Davis, senior bridge engineer, California Division of Highways, Sacramento; and K. S. Lo, structural engineer, T. Y. Lin, Kulka, Yang and Associates, San Francisco, California

5:30 p.m. — Buses leave for CENTENNIAL DINNER (see special events)

**EVENING SESSION**

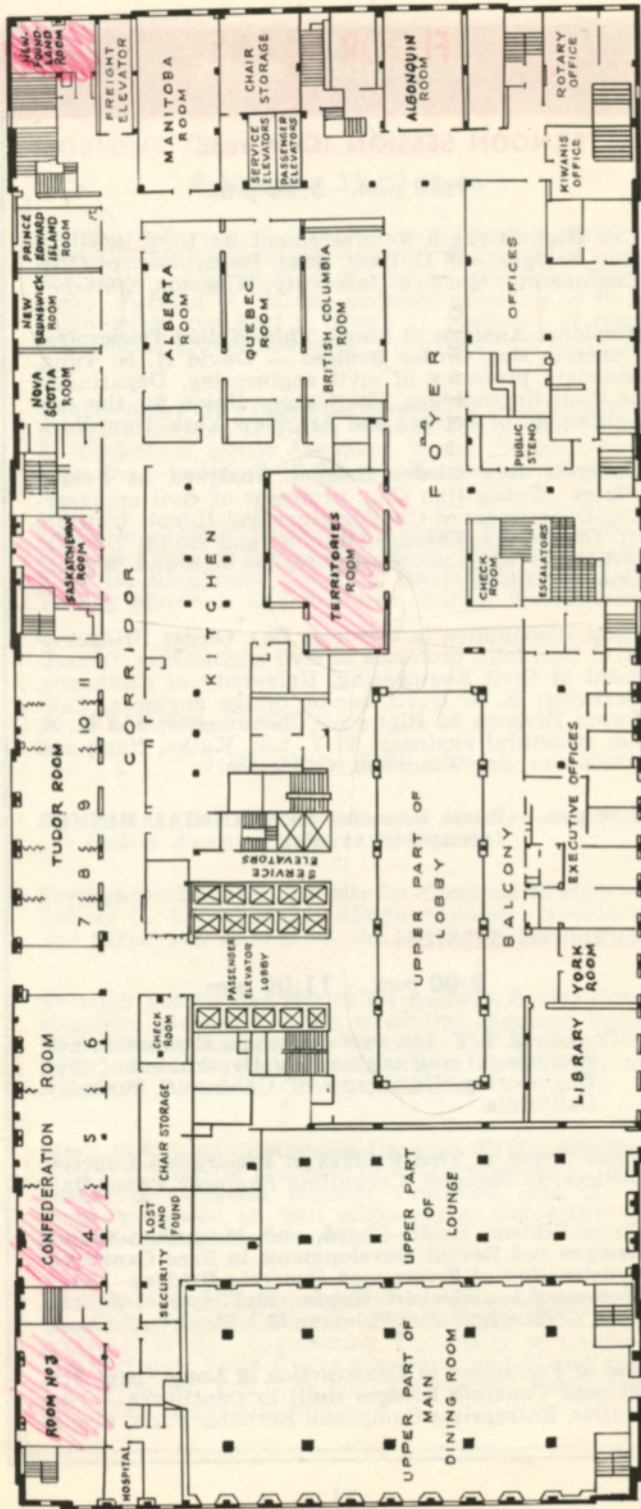
8:00 p.m. - 11:00 p.m.

Presiding: T. Y. Lin, vice-chairman, Committee 443; professor of civil engineering, Department of Civil Engineering, University of California, Berkeley, California

**Some Types of Tied Bridges in Prestressed Concrete**—Riccardo Morandi, Consulting Engineer, Rome, Italy

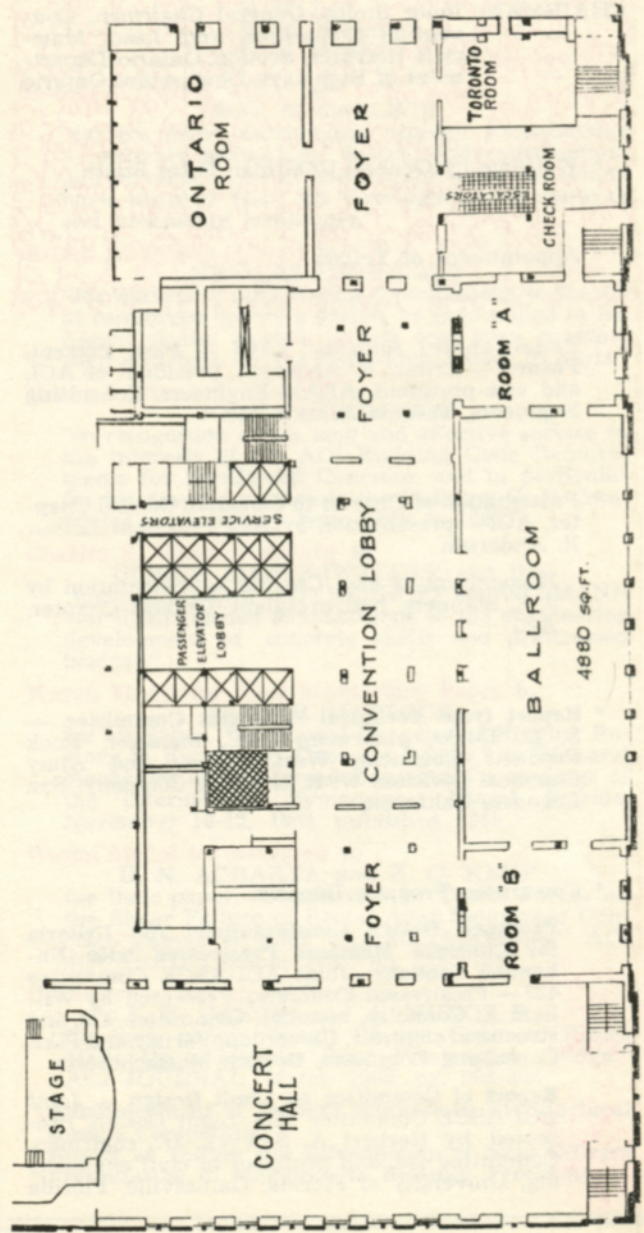
**Stress-Ribbon, Bridle-Chord, and Mushroom-Shaped Bridges and Recent Developments in Free Cantilever Construction of Prestressed Concrete Bridges**—Ulrich Finsterwalder, Herbert Kupfer, and Herbert Schambeck, Dyckerhoff and Widmann KG, Munich, Germany

**Use of Precasting in Construction of Long-Span, Prestressed Concrete Bridges Built in Cantilever**—Jean Muller, Entreprises Campenon Bernard, Paris, France



**MAIN MEZZANINE**

**FLOOR PLANS**



**CONVENTION FLOOR**



FIRST GENERAL SESSION

9:30 a.m. - 12:00 Noon . . . Concert Hall

**CHAIRMAN:** Peter Smith, General Chairman, Convention Committee and head, Materials Research Section, Ontario Department of Highways, Downsview, Ontario

\* Welcome by General Chairman Peter Smith

\* Appointment of Tellers

\* **Presidential Address: "ACI — Past, Present, Future"**— Arthur R. Anderson, president of ACI, and vice-president, ABAM Engineers, Consulting Engineers, Tacoma, Washington

\* Presentation of Charter to Canadian Capital Chapter, ACI— presentation by ACI President Arthur R. Anderson

Recognition of new Chapter— presentation by J. E. Stanners, past president, Ontario Chapter, ACI

\* **Report from Technical Activities Committee** — S. D. Burks, chairman, TAC, manager, Rock Products Chemicals West, Dewey and Almy Chemical Division, W. R. Grace & Company, San Leandro, California

\* Committee Progress Reports:

**Proposed Design Considerations and Criteria for Concrete Members Prestressed with Unbonded Tendons**—Joint ACI-ASCE Committee 423— Prestressed Concrete. Presented by William A. Connolly, member, Committee 423, and structural engineer, Cleverdon, Varney and Pike, Consulting Engineers, Boston, Massachusetts

**Report of Committee on Limit Design** — Joint ACI-ASCE Committee 428—Limit Design. Presented by Herbert A. Sawyer, Jr., chairman, Committee 428, and professor of civil engineering, University of Florida, Gainesville, Florida

12:30 p.m. . . . Concert Hall

AWARDS LUNCHEON

HONORARY MEMBERSHIP

F. M. Lea  
N. M. Newmark  
L. H. Tuthill

**Henry C. Turner Medal to**  
ROY W. CARLSON

"for his many outstanding original contributions to concrete technology, design, and construction; and in recognition of the further advances which have resulted from his development of research and measuring techniques."

**Alfred E. Lindau Award to**  
NICOLAS ESQUILLAN

"for numerous outstanding contributions to the art of reinforced concrete design, as exemplified in his design of the world's largest free span concrete shell structure for the Exposition Palace in Paris."

**Henry L. Kennedy Award to**  
JOHN P. THOMPSON

"in recognition of his long and effective service in the interests of the ACI Building Code Requirements for Reinforced Concrete, and in particular for his devoted service to the Building Code Committee as Secretary from 1949 to 1965."

**Charles S. Whitney Award to**  
ULRICH FINSTERWALDER and the engineering firm of DYKERHOFF and WIDMANN "for distinguished contributions to the engineering development of concrete shells and prestressed bridges."

**Wason Medal for Most Meritorious Paper to**  
ALAN H. MATTOCK for his paper, "Rotational Capacity of Hinging Regions in Reinforced Concrete Beams," in **Flexural Mechanics of Reinforced Concrete**, Proceedings of the International Symposium, Miami, Florida, November 10-12, 1964, published 1965.

**Wason Medal for Research to**  
D. N. ACHARYA and K. O. KEMP for their paper, "Significance of Dowel Forces on the Shear Failure of Rectangular Reinforced Concrete Beams Without Web Reinforcement," ACI JOURNAL, October 1965, pp. 1265-1280.

**Construction Practice Award to**  
E. R. CANCIO and A. MUÑOZ F. for their paper, "Small Precast Concrete Pieces Make Up a Medium Span Prestressed Bridge," ACI JOURNAL, March 1965, pp. 293-306.

\* Announcement of Student Winners in Architectural Design Competition  
\* Report of Tellers and Introduction of New Officers  
\* Presentation of Memento to Retiring President

## CONCURRENT



The concurrent sessions on Research by ACI Committee 115, differs from the other general sessions of the program in that the

### RESEARCH SESSION on REINFORCED CONCRETE

. . . Concert Hall

SESSION CHAIRMAN: Adrian Pauw, secretary of ACI Committee 115, and professor and chairman of civil engineering, Department of Civil Engineering, University of Missouri, Columbia, Missouri

ACTING SECRETARY: Bruce E. Foster, chief, Inorganic Building Materials Section, National Bureau of Standards, Washington, D.C.

**Blast Resistance of Reinforced Concrete Slabs**—William A. Keenan, research structural engineer, U.S. Naval Civil Engineering Laboratory, Port Hueneme, California

**Load Transfer Problems in Reinforced Concrete Floor Slabs**—James O. Jirsa, professor, Civil Engineering Department, Rice University, Houston, Texas

**Inelastic Behavior of Reinforced Concrete Frames under Cyclic Loads**—Gajanan M. Sabnis, research assistant, Cornell University, Ithaca, New York

**Bond Characteristics of Prestressing Strand**—Manfred Stocker, Department of Civil Engineering, University of Illinois, Urbana, Illinois

## SESSIONS



information is not released for publication. Request is made that the proceedings be regarded as CONFIDENTIAL.

### RESEARCH SESSION on PLAIN CONCRETE

. . . Ontario Room

SESSION CHAIRMAN: William A. Cordon, chairman of ACI Committee 115 - Research, and associate professor and director of structural materials research laboratory, Department of Civil Engineering, Utah State University, Logan, Utah

ACTING SECRETARY: Joseph H. Walker, vice-president of Research and Development, Portland Cement Association, Skokie, Illinois

**Compressive Strength of Concrete at Temperatures to 1200 F**—M. S. Abrams, Portland Cement Association, Skokie, Illinois

**Use of Time of Set Measurements in Prediction of Form Pressure**—T. G. Clendenning, masonry research engineer; and M. T. Loughborough, Hydro-Electric Power Commission of Ontario, Toronto, Ontario

**New Binders for Concrete for Use in Desalination Plants**—G. L. Kalousek, research advisor on concrete, U.S. Bureau of Reclamation, Denver, Colorado

**Structural Concrete with Nylon Fibres**—Kishor C. Mehta, professor, Department of Civil Engineering, Texas Technological College, Lubbock, Texas

## CONCURRENT

## SESSIONS



### RESEARCH SESSION on REINFORCED CONCRETE (Continued)

. . . Concert Hall

**Effects of Variable Repeated Loading on Reinforced Concrete Structures**—V. V. Bertero, professor of civil engineering, University of California, Berkeley, California

**Favorable and Unfavorable Effects of Non-Tensioned Steel in Prestressed Concrete Beams**—Dan E. Branson, professor of civil engineering; and A. F. Shaikh, instructor, University of Iowa, Iowa City, Iowa

**Studies on Cracks and Bond in Prestressed Concrete Beams**—P. W. Abeles, visiting professor; F. M. Barton; J. Slepetz, Department of Civil Engineering, Duke University, Durham, North Carolina

**Effect of Strain-Hardening on the Shakedown of Concrete Beams**—C. Yimsirikul; and K. H. Gerstle, professor of civil engineering, Department of Civil Engineering, University of Colorado, Boulder, Colorado

**Is it Shear or Bond? The Cause of Diagonal Tension Failure**—G. N. J. Kani, professor of civil engineering, Department of Civil Engineering, University of Toronto, Toronto, Ontario

**Integration of Service Systems in Flat Plate Structures**—John M. Hanson, manager, Products and Applications Development Section, Portland Cement Association, Skokie, Illinois



### RESEARCH SESSION on PLAIN CONCRETE (Continued)

. . . Ontario Room

**Dental Cements — Are They of Structural Value?**—J. H. Appleton, professor of civil engineering, University of Alabama, Birmingham, Alabama

**Creep of Concrete Under Triaxial Compressive Stresses**—A. M. Neville, dean; K. S. Gopalakrishnan, graduate student; and A. Ghali, associate professor, University of Calgary, Calgary, Alberta

**Microcracking and Time Dependent Strains of Plain Concrete**—Bernard L. Meyers, research assistant, Cornell University, Ithaca, New York

**Difficulties in the Production of High-Strength Air-Entrained Concrete**—Delmar L. Bloem, director of engineering, National Sand & Gravel Association, and the National Ready-Mixed Concrete Association, Silver Spring, Maryland

**Influence of Water-Reducing Agents on Water-Cement Ratio Strength Relationship**—K. R. Lauer, associate professor of civil engineering; and J. A. Fitzpatrick, University of Notre Dame, Notre Dame, Indiana

**Tension Bond Between Mortar and Aggregate — a Two-Dimensional Study Utilizing the Split Cylinder Test**—W. G. Heslop, associate professor of civil engineering, University of British Columbia, Vancouver, British Columbia

**CONCURRENT SESSIONS**

(Note time designations for each topic)



**DESIGN AND ANALYSIS**

. . . Ballroom

CHAIRMAN: H. E. H. Roy, president, Ontario Chapter, ACI; and partner, John B. Parkin Associates, Architects and Engineers, Toronto, Ontario

- 8:35 a.m. **Dynamic Characteristics of a Reinforced Concrete Building** — N. Norby Nielsen, associate professor, Department of Civil Engineering, University of Illinois, Urbana, Illinois
- 9:00 Discussion
- 9:10 **Door Openings in Shear Walls** — Joseph Schwaighofer, associate professor, Department of Civil Engineering, University of Toronto, Toronto, Ontario
- 9:35 Discussion
- 9:45 COFFEE BREAK
- 10:05 **Behavior of Plain and Reinforced Concrete Beams Under Combined Bending, Shear and Torsion** — M. S. Mirza, research associate; and J. O. McCutcheon, professor and chairman, Department of Civil Engineering and Applied Mechanics, McGill University, Montreal, Quebec
- 10:30 Discussion
- 10:40 **Flat Plate Analysis of Olentangy River Dormitories** — Russel S. Fling, president, Fling and Eeman, Inc., Columbus, Ohio
- 11:05 Discussion



**CONCRETE PERFORMANCE — RESISTANCE OF CONCRETE TO SULFATE AND OTHER ENVIRONMENTAL CONDITIONS**

. . . Concert Hall

—sponsored by the Division of Building Research, NATIONAL RESEARCH COUNCIL of Canada, Ottawa, Ontario

**A Symposium held in honor of the late Dr. T. Thorvaldson**

SESSION CO-CHAIRMEN: R. F. Legget, director, Division of Building Research; P. J. Sereda, research officer, Division of Building Research, National Research Council, Ottawa, Ontario

- 8:35 a.m. **Contributions of Dr. T. Thorvaldson to Cement and Concrete Research**—C. J. MacKenzie, former president of National Research Council; and E. G. Swenson, research officer, Division of Building Research, National Research Council, Ottawa, Ontario
- 9:00 **Some Studies on the Performance of Concrete Structures in Sulfate-Bearing Environments** — F. M. Lea, retired director, Department of Science and Industrial Research, Berkhamsted, Herts., England
- 9:30 COFFEE BREAK
- 9:50 **Field and Laboratory Tests of Sulfate Resistance of Concrete**—Bryant Mather, chief, Concrete Division, U.S. Army Engineer Waterways Experiment Station, Jackson, Mississippi
- 10:20 **Combating Sulfate Attack on Concrete on Bureau of Reclamation Projects** — B. P. Bellport, chief engineer, Bureau of Reclamation, Denver, Colorado
- 10:50 **Field and Laboratory Studies of the Sulfate Resistance of Concrete** — George Verbeck, director of research, Research and Development Division, Portland Cement Association, Skokie, Illinois

FRIDAY, April 7 . . . . .

## CONCURRENT

(Note time designations for each topic)



### CONSTRUCTION

. . . Ballroom

SESSION CHAIRMAN: J. Neil Mustard, vice-president, Ontario Chapter, ACI, and supervising engineer, Hydro Electric Power Commission of Ontario, Toronto, Ontario

- 1:35 p.m. **Construction of Habitat '67 at Expo 67** — D. J. FitzGerald, project manager, Francon, Ltd., Montreal, Quebec
- 1:55 Discussion
- 2:05 **High Strength Concrete at Willows Creek** — A. J. Burgess, chief engineer, Morrison, Hershfield, Millman, and Huggins, Ltd., Toronto, Ontario; J. Bunting, construction supervisor, Guy F. Atkinson Co., South San Francisco, California; J. Ryell, concrete testing engineer, Ontario Department of Highways, Downsview, Ontario
- 2:25 Discussion
- 2:35 COFFEE BREAK
- 2:55 **Rubble Aggregate Concrete Construction at Trent University**—Morden S. Yolles, president, M. S. Yolles Associates, Ltd., Consulting Engineers, Toronto, Ontario
- 3:15 Discussion
- 3:25 **Performance Criteria for Concrete Design and Construction**—A presentation by: Bertold E. Weinberg, planning coordinator, State University Construction Fund, Albany, New York; Irwin J. Speyer, consulting engineer, New York, New York; Edward L. Friedman, I. M. Pei and Partners, New York; and James R. Dunn, president, James R. Dunn & Associates, Geologists, Averill Park, New York
- 3:45 Discussion

1:30 p.m. to 4:30 p.m.

## SESSIONS



### CONCRETE PERFORMANCE

(Second Session)

. . . Concert Hall

SESSION CO-CHAIRMEN: N. B. Hutcheon, assistant director; and E. G. Swenson, research officer, Division of Building Research, National Research Council, Ottawa, Ontario

- 1:30 **The Chemistry of Sulfate-Resisting Cements**—W. C. Hansen, consulting chemist, Valparaiso, Indiana
- 1:55 **Experience With Concrete in Sulfate Environments in Western Canada**—G. C. Price, concrete engineer; and R. Peterson, chief soil mechanics and materials engineer, Prairie Farm Rehabilitation Administration, Saskatoon, Saskatchewan
- 2:20 **Experience in the Winnipeg Area With Sulfate-Resisting Cement Concrete**—W. D. Hurst, city engineer, City of Winnipeg, Winnipeg, Manitoba
- 2:45 COFFEE BREAK
- 3:00 **Scaling of Concrete By Frost Action**—J. H. Keyser, chief, Technical Division, Control and Research Laboratory, Department of Public Works, City of Montreal, Montreal, Quebec
- 3:30 **Case Histories of Concrete Durability in Ontario Highway Structures**—J. Ryell, concrete testing engineer; and Peter Smith, head, Materials Research Section, Ontario Department of Highways, Downsview, Ontario
- 4:00 **Observations of Sidewalk Concrete During Fifteen Years Exposure**—W. S. Weaver, chief chemist and manager of research; and H. L. Isabelle, chief engineer of sales, Canada Cement Company, Montreal, Quebec
- Examples of Concrete Performance in Sea Water**—D. C. Tibbets, research officer, Atlantic Regional Station, National Research Council, Halifax, Nova Scotia (presented by title only)
- Field Performance of Concretes in Prairie Soils of High Sulfate Contents**—J. J. Hamilton, and G. O. Handegord, research officers, Prairie Regional Station, National Research Council, Saskatoon, Saskatchewan (Presented by title only)

# TORONTO CONVENTION OFFICERS

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Peter Smith

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A. G. Lessel	(Exhibits)
A. M. Lount	(Advisor)
C. F. Morrison	(Education)
E. M. Pell	(Field Trips)
R. P. G. Pennington	(Printing)
R. T. Sheppard	(Entertainment)
E. Munro	(Reception)

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### Ladies Arrangements

Mr. J. L. Franceschini and the wives of the local committee members

Ladies Hospitality Suite . . . Room A

## LADIES PROGRAM

**MON., April 4**

9:00 a.m.- 5:00 p.m. Registration

9:30 a.m.-10:30 a.m. Coffee and Danish

2:00 p.m.- Tour Toronto City Hall

**TUES., April 4**

9:00 a.m.- 5:00 p.m. Registration

9:30 a.m.-10:30 a.m. Coffee and Danish

10:30 a.m.- FREE DAY

6:30 p.m.- 8:00 p.m. "Icebreaker Event"

**WED., April 5**

9:00 a.m.- 5:00 p.m. Registration

9:30 a.m.-10:30 a.m. Coffee and Danish

10:30 a.m.-

LUNCH at the Toronto Board of Trade Country Club, Woodbridge, Ontario. Home of the 1967 Carling's World Golf Championship (NO CHARGE). Includes tour, cocktails, lunch, and perhaps a small fashion show during lunch. Leave Country Club at approximately 2:00 p.m. Enroute to Royal York Hotel, by bus, a stop will be made at the Yorkdale Shopping Centre . . . the world's largest enclosed shopping mall.

5:30 p.m. Buses will leave from the Front Street exit for the Queen Elizabeth Building and the Centennial Dinner. Two classes of tickets are available. Ask at the Registration Desk.

6:30 p.m. CENTENNIAL DINNER with husbands at the Queen Elizabeth Building

**THUR., April 6**

9:00 a.m.- 5:00 p.m. Registration

10:00 a.m.-

Meet in hotel lobby in front of main doors (Front Street) for walking tour of Toronto's Subway to Bloor Street, the Colonnade, Lothien Mews, and Yorkville's famous boutiques. Shopping and lunch at will. A map and names of stores and restaurants will be supplied for your convenience.

8:30 p.m.-

O'KEEFE CENTRE—The National Ballet performance "La Sylphide" (subject to change). Followed by refreshments and dancing to a three-piece orchestra in the lower lounge . . . our own private party. Approximate cost . . . \$17.00 per couple, plus refreshments. WHEN DID YOU LAST TAKE YOUR HUSBAND OUT?

**FRI., April 7**

9:00 a.m.-

Coffee and Danish

## TECHNICAL-EDUCATIONAL EXHIBITS

Be sure to visit each of these exhibits. . . . Discover for yourself the latest materials, equipment, and services that are available to help you in your endeavor . . . and, at the same time, qualify for valuable door prizes.

American Can Company  
BBR Canada Limited  
Bethlehem Steel Corporation  
CONENCO Canada Limited  
Desco International Association  
Erico Products, Inc.  
The Fly Ash Group:  
    Chicago Fly Ash Company  
    Detroit Edison Company  
    Viall-Ohio Fly Ash Company  
Gateway Erectors, Inc.  
Geodex International  
J. E. Goodman Sales Limited  
Grace Construction Materials  
J. Harris & Son, Limited  
James Electronics, Inc.  
Master Builders  
W. R. Meadows of Canada Limited  
Protex Industries, Inc.  
Sika Chemical Corporation  
Sonoco Products Company  
TESTlab Corporation  
Union Carbide Corporation  
United States Steel Corporation  
VSL Canada, Limited