

Board of directors

President

James R. Libby

Vice presidents

Jo Coke

James O. Jirsa

Directors

George B. Barney

Peter H. Emmons

Robert A. Epifano

Catherine E. French

David P. Gustafson

Terence C. Holland

José M. Izquierdo

Debrethann R. Cagley Orsak

B. Duke Pointer

Philip T. Seabrook

Thomas D. Verti

Sharon L. Wood

Past president board members

Robert F. Mast

James S. Pierce

Richard N. White

Executive vice president

James G. Toscas

Technical activities committee

Terence C. Holland, chairman

Daniel W. Falconer, secretary

Nicholas J. Carino

James Colville

Om Dixit

Charles W. Dolan

S. K. Ghosh

Brian B. Hope

Richard E. Klingner

Tony C. Liu

Jack P. Moehle

B. Duke Pointer

Randall W. Poston

D. Gerry Walters

Staff

Executive vice president

James G. Toscas

Journals/Special publications

Managing editor

Rebecca A. Hartford

Associate editors

Carl R. Bischof

Juliet A. Byington

Nicholle M. Cormier

Production assistant

Jane D. Carroll

Editorial secretary

Shirley Zarb

Engineering department

Managing director

Daniel W. Falconer

Manager, technical documents

Todd R. Watson

Chief engineer

Shuaib H. Ahmad

ACI Structural Journal

JANUARY-FEBRUARY 1999, VOL. 96, NO. 1

A JOURNAL OF THE AMERICAN CONCRETE INSTITUTE
AN INTERNATIONAL TECHNICAL SOCIETY

- 3 **Experimental Study on Failure of Reinforced Concrete Building**, by Patricio Bonelli, René Tobar, and Gilberto Leiva
- 9 **Calculation Method for Design of Reinforced Concrete Columns under Fire Conditions**, by Jean-Claude Dotreppe, Jean-Marc Franssen, and Yves Vanderzeypen
- 19 **Flexural Stiffness of Composite Columns Subjected to Major Axis Bending**, by S. Ali Mirza and Timo K. Tikka
- 29 **Confinement of Reinforced Concrete Columns with Welded Reinforcement Grids**, by Murat Saatcioglu and Mongi Griira
- 40 **Toward a Rational Approach for Design of Minimum Torsion Reinforcement**, by Mohamed A. Ali and Richard N. White
- 46 **Lateral Load Response of Strengthened Reinforced Concrete Beam-to-Column Joints**, by A. G. Tsonos
- 57 **Performance of Existing Bridge Columns under Cyclic Loading—Part 2: Analysis and Comparisons with Theory**, by Omar A. Jara-dat, David I. McLean, and M. Lee Marsh
- 68 **Rehabilitation of Shear Critical Concrete Columns by Use of Rectangular Steel Jackets**, by Riyad S. Aboutaha, Michael D. Engelhardt, James O. Jirsa, and Michael E. Kreger
- 79 **Reinforced Concrete Slab-Column Edge Connections with Openings**, by Ehab F. El-Salakawy, Maria Anna Polak, and Monir H. Soliman
- 88 **Size Effect on Compressive Strength of Plain and Spirally Reinforced Concrete Cylinders**, by Jin-Keun Kim, Seong-Tae Yi, Chan-Kyu Park, and Seok-Hong Eo
- 95 **Durability of Aramid Fiber Reinforced Plastic (AFRP) Pretensioned Elements under Tidal/Thermal Cycles**, by Rajan Sen, Mohsen Shahawy, Jose Rosas, and Satya Sukumar
- 105 **Slurry Infiltrated Mat Concrete (SIMCON)-Based Shear Retrofit of Reinforced Concrete Members**, by Neven Krstulovic-Opara and Mohammad Jamal Al-Shannag
- 115 **Effect of Corner Angle on Efficiency of Reinforced Concrete Joints under Opening Bending Moment**, by Hashim M. S. Abdul-Wahab and Shamil A. R. Salman
- 122 **Cost-Optimum Design for Shear Reinforced Concrete Beams**, by Ahmed M. Azmy and Mohamed H. Eid
- 127 **Nonlinear Analysis of Reinforced Concrete Slabs Subjected to Fire**, by Zhaohui Huang, Ian W. Burgess, and Roger J. Plank
- 136 **Shear and Flexural Behavior of Lightweight Concrete Bridge Columns in Seismic Regions**, by Mervyn J. Kowalsky, M. J. Nigel Priestly, and Frieder Seible
- 149 **Flexural Strength of Concrete Beams with Corroding Reinforcement**, by P. S. Mangat and M. S. Elgarf
- 159 **In ACI Materials Journal**

Discussion is welcomed for all materials published in this issue. To facilitate expeditious handling of committee reports and standards, observe dates found with those items. Discussion of other items will appear in the November-December 1999 issue if received by July 1, 1999. Discussion of material received after specified dates will be considered individually for publication or private response.

Annual index published in the March-April issue.

ACI Structural Journal

Copyright © 1999 American Concrete Institute. Printed in the United States of America.

The *ACI Structural Journal* (ISSN 0889-3241) is published bimonthly by the American Concrete Institute. Publication office: 38800 Country Club Drive, Farmington Hills, MI 48331. Periodicals postage paid at Detroit, MI, and at additional mailing offices. Subscription rates: \$116 per year (U.S. and possessions), \$124 (elsewhere), payable in advance. POSTMASTER: Send address changes to: *ACI Structural Journal*, P.O. Box 9094, Farmington Hills, MI 48333-9094.

Canadian GST: R 1226213149.

Direct correspondence to P.O. Box 9094, Farmington Hills, MI 48333-9094. Telephone: (248) 848-3700. Facsimile (FAX): (248) 848-3701. Web site: <http://www.aci-int.org>