REVIEWS OF CURRENT PUBLICATIONS

Reinforced Concrete Structures in Seismic Zones

This volume is an outgrowth of a Symposium on Reinforced Concrete Structures in Seismic Zones, held at the 1974 ACI Annual Convention in San Francisco and sponsored by the ACI Technical Activities Committee, ACI Committees 318, 348, 352, 426, 441, 442 and 443, and the Structural Engineers Association of Northern California.

Seventeen papers were presented at the Symposium which was organized around three sessions, Reinforced Concrete Structural Systems in Seismic Zones, Shear Problems in Seismic Zones and Design Problems.

(Special Publication SP-53, American Concrete Institute, Detroit, Michigan, 1977, 486 pp.)

Deformation of Concrete Structures

Dan Earle Branson

This book provides a comprehensive treatment of initial and time-dependent deformation of reinforced and prestressed concrete structures. The emphasis is on structural serviceability and esthetic criteria rather than the safety or strength aspects of design.

Detailed numerical examples and comparisons between different methods with experimental results are included in the text. In addition, comparisons of behavior are made between laboratory specimens and actual structures.

The following topics are discussed in detail:

1. Material properties.
2. Differential shrinkage, creep, and temperature in composite beams.
3. Deflection of reinforced concrete beams and one-way slabs, and both steel and reinforced concrete composite beams.
4. Deflection of two-way reinforced concrete slab systems.
5. Loss of prestress, camber and deflection of noncomposite and composite prestressed concrete members.
6. Control of deflections.

(McGraw-Hill International Book Company, 1221 Avenue of the Americas, New York, N.Y. 10020, 1977, 480 pp., $39.50.)

Loss of Prestress Due to Relaxation After Transfer

H. N. Grouni

Expressions for direct computation of relaxation losses after transfer of low relaxation and stress-relieved steels are presented. The expressions were derived by iterating the applicable pure relaxation formula with a time-related function defining the rate of plastic strains in concrete. The resulting expressions were reduced to a form comparable with those in recent codes.

(*ACI Journal,* Proceedings V. 75, No. 2, February 1978, pp. 64-66.)

Review of Guideway Design Criteria in Existing Transit System Codes

R. A. Dorton and H. N. Grouni

With the recent revival of interest in mass transit systems, it has become apparent that a design code covering concrete guideway structures is needed. This paper is considered a necessary first step in preparing a new transit code. Basic design philosophies and criteria adopted by some of the light rail and heavy rail transit authorities in North America are reviewed and compared. The more familiar highway and railway transportation authorities are included for direct comparison. Relevant design criteria of the British Standards Institute are also included as a reference to European systems. The study points out a wide variation in design concepts and

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approaches. It also shows that, while certain criteria of guideway design are well covered, other significant aspects are either left out or lack adequate coverage. Recommendations are presented to cover these discrepancies in future codes.

(*ACI Journal,* Proceedings V. 75, No. 4, April 1978, pp. 134-144.)

The Wisdom of the Structure

Halvard W. Birkeland

This sixth ACI Raymond E. Davis Lecture is a philosophical discussion of how a structure responds to engineers and engineering. To illustrate this, the author cites various examples, such as: beams, dams, trusses, anchors, and penstocks, while examining such properties as: flexure, tensile stress, shear and compressive strength.

The author states that where a computer or a brain might fail in understanding engineering concepts, the structure will not. The structure knows all the answers in stresses and strains, and it decides whether to stand or fall.

(*ACI Journal,* Proceedings V. 75, No. 4, April 1978, pp. 105-111.)

Partially Prestressed Concrete—Theory and Experiments

A. S. G. Bruggeling, S. H. Brunekreef, and J. C. Walraven

Reports the results of an investigation on partially prestressed concrete conducted at Delft University of Technology, Delft, The Netherlands. The study was divided in four parts:

1. Behavior of partially prestressed concrete beams loaded in pure bending.
2. Tests on partially prestressed T-beams subject to shear and bending.
3. Redistribution of stresses in axially compressed reinforced concrete columns.
4. Time-dependent deflection of partially prestressed concrete beams.

A method is suggested for designing partially prestressed concrete members which takes into account time-dependent effects. In general, the experimental results agree with the theoretical predictions.

The investigation on partial prestressing is an on-going program.

(*Heron,* V. 23, No. 1, 1978, 85 pp. plus Appendices.)

Creep and Shrinkage Data for Elevated Prestressed Concrete Guideways

H. G. Russell

Results of an experimental investigation to determine the time-dependent properties of materials for large prestressed guideway girders are reported. Both elastic and long-term creep and shrinkage deformations were measured on standard 6 x 12 in. cylinders and on full-size reinforced concrete beam sections. Comparisons of the results were used to determine the effect of size on creep and shrinkage. Extrapolation of the data to other sizes of guideway girders is presented. The results of this study, obtained over a period of two years, can be used in the calculation of camber and axial shortening in girders.

(*ACI Journal,* Proceedings V. 75, No. 4, Apr. 1978, pp. 124-133.)

Design of Concrete Bridges for Temperature Gradients

M. J. Nigel Priestly

This paper reviews the state of the art of

ambient thermal loading of prestressed and reinforced concrete bridges. Discussion is generally confined to the behavior under vertical temperature gradients induced by solar radiation input to the deck surface.

Methods predicting design temperature gradients from local meteorological conditions are discussed, and a general analytical method for predicting the vertical distribution of thermally induced stress is developed. Results from laboratory and in situ experiments confirm the validity of the analytical approach.

The influence of cracking on the thermal response and the significance of thermal loading to ultimate capacity are briefly discussed.

(*ACI Journal,* Proceedings V. 75, No. 5, May 1978, pp. 209-217.)

Case Study of Effects of Post-Tensioning the Beams in a 45-Story Building

Mark Fintel and S. K. Ghosh

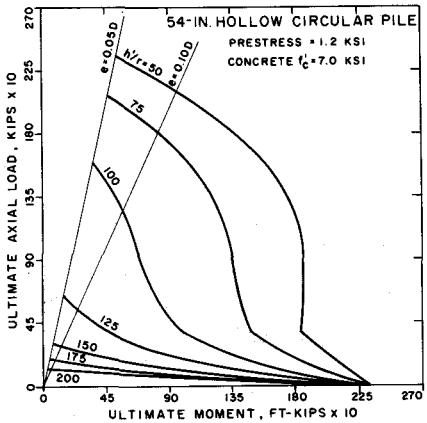
This paper presents a case study of the effects of story-by-story post-tensioning on the various parts of a structure, during construction as well as service life. Mathematical models of a progressively growing multistory building are analyzed in stages corresponding to the separate stressing of each floor.

A determination is made as to whether a significant portion of the applied prestressing force may be wasted in bending the rigid walls or columns, thereby reducing the effective prestress in the beams. The possible effects of creep shortening of the beams due to post-tensioning are also studied.

The authors conclude that no special sliding details, which have sometimes been used, are necessary for the post-tensioned beams in the typical floor of a multistory building.

(*ACI Journal,* Proceedings, V. 75, No. 5, May 1978, pp. 184-191.)

Piling Interaction Diagrams



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