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Dr. W. Gene Corley – Contributions to the ACI 318 Structural Concrete Building Code

Randall W. Poston
Chair – ACI Committee 318

Overview of Presentation

- Corley and Committee 318
- Contributions to 318 Code provisions
- Chairmanship years
- 318-14 Code Reorganization contributions
- Corley legacy

Corley and Committee 318

- Began serving in 1973
- Served as Chair from 1989 to 1995
- Served as member for 40 years

Contributions to 318 Code
Chapter 8: Analysis and Design—General Requirements


Chapter 11: Shear and Torsion


Chapter 13: Two-Way Slab Systems


Chapter 21: Earthquake-Resistant Structures


Chair - 1989 to 1995

Chair 1989 to 2005

- Document title is changed to “Building Code Requirements for Structural Concrete” to reflect expanded content
- Helical ties, silica fume, shrinkage-compensating concrete, and concrete slabs cast on steel form deck are explicitly recognized
- A procedure for removal of shores and installation of reshores, backed up by calculations, is mandated for contractors.

Chair 1989 to 2005

- Minimum flexural reinforcement requirements tied to concrete strength
- Slender column design provisions are expanded, additional methods for approximate analysis are introduced, and stiffness values are defined
- Design provisions for torsion are revised and apply equally to reinforced and prestressed concrete (thin-wall, space truss analogy)

Chair - 1989 to 2005

- Development length calculation for deformed bars in tension is simplified
- Chapter 13, Two-way slab systems, is reformatted and incorporates modified provisions for slab-to-column moment transfer
- Chapter 16, Precast Concrete, is greatly expanded and incorporates detailed requirements for structural integrity

Chair - 1989 to 2005

- A new Chapter 22, Structural Plain Concrete, is added
- A new Appendix B, Unified Provisions for Reinforced and Prestressed Concrete Flexural and Compression Members, is introduced
- A new Appendix C, Alternative Load and Strength Reduction Factors, is provided for the design of “mixed construction.” (Same load factors & factored load combinations for steel frames, masonry, or timber, on concrete footings.)
Gene was always a proponent for use of High Strength Concrete. Based on research conducted at PCA in the '70s, he maintained that the rectangular stress block factors need not be changed for high strength concrete. Based on research conducted in the early '80s, the limit on \( \sqrt{f_{c}'} \) was set starting in the '89 code at 100 psi.

### Support for Reorganization

- In 2003, committee 318 began discussion on code organization.
- In 2006, ACI surveyed users about experience using 318.

### ACI 318-14 Reorganization

- W.G. Corley was a member.
- In 2006, focus groups were held with practicing engineers.
- In 2007, a workshop concluded the reorganization effort should continue.
- In 2007, an outline was developed by ACI 318 Steering Committee.
- In 2008, committee began to reorganize the Code.

### Why Reorganize 318?

**How Do I Know If I Have Fully Satisfied the Code?**

- Related Code provisions in several chapters.
- Code assumes user knows which provisions apply in each use.
- More than 2,500 provisions tax this assumption.
General Goal:
- To improve overall logic of information location and for greater ease-of-use.

ACI 318-14 Reorganization

Survey feedback:
- Engineers want all related information for a member’s design and detailing easily located
- Engineers want the Code to be more closely related to how they design members

Specific Goals:
- Users know when design is complete
- Provide explicit detailing requirements for each member
- Improve consistency of language and style
- Allow for future technology/new topics

ACI 318-14 Reorganization

Process

As balloting occurred, some gaps were identified:
- Structural system performance
- Diaphragm design and detailing
- Foundation systems
Corley Legacy

- Code to protect public safety
- Two-way slab system design and analysis
  - Equivalent frame analysis
  - Moment transfer and punching shear
- Shear wall behavior and design
- Very supportive of reorganization
- Empathy for structural designers

Corley Legacy

Dr. Corley would not let current committee eliminate shearheads from the code!

Thank You!