

The Reorganized ACI 318 Code Structure

Building consensus on a member-based format

BY CHARLES W. DOLAN AND RANDALL W. POSTON

In an earlier article,¹ we presented the case for revising ACI 318, “Building Code Requirements for Structural Concrete and Commentary,” (hereinafter referred to as “the Code”). The steps defining the decision to continue reorganizing are not repeated here; rather, the next phase in developing a reorganized Code is reported.

As restructuring of the Code has been deliberated, the committee has maintained its perspective by acknowledging indelible factors, including:

- The current Code structure is well known within the concrete industry, so a major revision will significantly impact Code users;
- Code users comprise designers, building officials, academics, and contractors; and each group has a unique perspective on Code application; and

- The revised Code should be easier to navigate than the existing document, minimizing the possibility that a user would inadvertently omit a Code provision.

The emphasis of the Code has always been, and will continue to be, on minimum requirements for life safety. While engineering practice has resulted in the Code becoming increasingly complex through the years, many users are familiar with its content and flow. So, as part of the reorganization, the committee has also recognized that there should be a map that allows the user to move between the existing and revised formats.

CODE DEVELOPMENT PRINCIPLES

As discussed in the previous article, a member-based format was selected in February 2007. After that

decision, a task group developed detailed goals for the new Code, including:

- Eliminate or reduce duplication;
- Establish a structure that allows a user to follow the provisions within a chapter covering a specific member type (for example, beam, column, or slab) and be assured that all provisions for that member are satisfied;
- Establish a hierarchy of methods, with the simplest followed by more complex alternatives;
- Use figures and tables to clarify provisions;
- Focus on performance requirements where possible, with prescriptive requirements provided as “deemed to satisfy” options;
- Improve the clarity of structural integrity provisions; and
- Retain the current side-by-side Code and Commentary format.

A member-based design format includes, in a single location, key aspects for the design of a specific member type (for example, beams). Thus, strength, structural integrity, serviceability, maximum and minimum reinforcement requirements, and specific reinforcement details are combined in a logical sequence. Because the earthquake provisions had just been updated in the 2008 version of the Code, the task group recommended that they remain in a separate, consolidated chapter for the present. Although they may

eventually be incorporated into the member chapters, the task group expressed concern that users had not had sufficient exposure to these provisions to allow them to be integrated into the member-based format at this time.

DETAILED OUTLINE

Revision of the Code is an enormous task for a committee comprised of volunteers. The ACI Board of Direction supported the reorganization by allocating resources to the ACI engineering staff and a consulting team to prepare a detailed outline and draft chapters. The consulting team consisted of two ACI members who had served on ACI Committee 318 for a number of years.

One draft chapter was prepared to assess the reorganization complexity. This exercise identified several major issues needing further development. First, some current Code sections needed to be distributed among multiple member types. Second, some topics were found to have no Code provisions. Third, a number of current provisions had no corresponding locations in the new format. Fourth, there was considerable repetition of some requirements.

The detailed outline was reviewed by a group comprising the subcommittee Chairs of ACI Committee 318. To reduce duplication, this group suggested developing “toolboxes” for flexural, axial, shear, and torsional design requirements common to all member types as well as a “toolbox” for standard reinforcement details (Fig. 1). This structure allowed each member chapter to refer to the appropriate toolbox chapter to reduce duplication.

BEFORE THE FULL COMMITTEE

The ACI 318 Building Code committee is empanelled for a 6-year period. An updated outline was circulated to the ACI 318-14 membership at the Spring 2008 Convention in Los Angeles, CA. The outline was

presented to the full committee, discussed in subcommittee meetings, debated in the full committee meeting, and overwhelmingly approved in principle.

Development of the first draft

ACI 318 Chair Poston established a steering committee comprised of all incoming subcommittee Chairs as well as ACI 318 Subcommittee R, Code Reorganization, to address the proposed changes. ACI staff was directed to develop draft chapters for several representative member types. These chapters were reviewed several times by the steering committee.

The first draft of the 2014 Code was completed in January 2009 and reviewed by the steering committee. Their comments were incorporated into a second draft that was submitted to the full committee at the spring 2009 meeting in San Antonio, TX.

The first task of ACI Committee 318 is to validate the revision of the 2008 Code into the 2014 format. This activity resulted in nearly 100 subcommittee ballots in 2009. The subcommittees also addressed new language and sections developed to fill in some of the gaps identified in the draft outlines. For example, a new chapter, Structural Systems, was developed by Subcommittee H. Figure 1 provides a block diagram of the revised Code and chapter numbers.

The revised Code format allows a user to refer to a chapter for design and detailing requirements for a member, not just a member section. The toolbox sections contain most of the behavior material from the earlier Codes and are cross referenced in each member chapter. Thus, provisions appear only once, and the cross-referencing assures that each critical provision is clearly identified. Similarly, the reinforcement detailing chapter contains the general requirements for detailing. Specific member detailing requirements appear in the member chapter or are referenced in the member chapters if

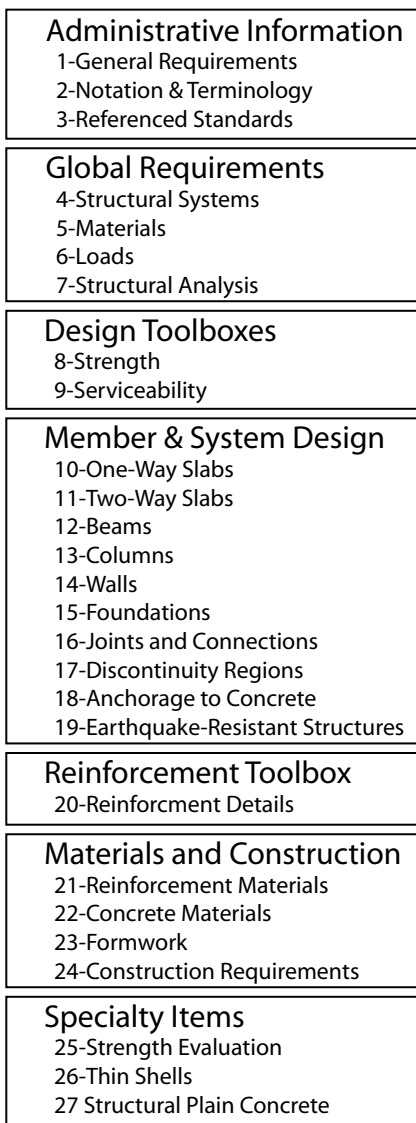


Fig. 1: Block diagram of the revised ACI 318 Code structure

the details are part of a larger group of common information. While the Code addresses each member, it was developed with the understanding that some users will have truly unique design conditions. The expectation is that the users will find sufficient guidance to proceed without undue restraint.

Concurrent activities

During much of this work, ACI Committee 318 had two major concurrent tasks. In addition to the future reorganization, the committee reviewed recommended changes for the 2011 Building Code. Changes to the 2011 Building Code were approved by the committee in June 2010, so most of the committee's focus is now directed toward the reorganized version of the Code.

The urgency of these activities significantly increased with the recent announcement by the International Code Council that all the materials Codes that are to be included by reference in the International Building Code must be available to the public in 2013. This announcement effectively compressed the reorganization schedule for ACI 318 by 1 year, so the new format will be the 2013 Code.

As of August 2010, more than half of the chapters of the 2013 Code have been balloted by the full committee. While a number of negative ballot items remain unresolved, the process is well underway. As sections are accepted by the committee, they are incorporated into the 2013 Code draft. Gaps identified in this process, as well as those chapters that are not fully accepted, will become the work of the committee between now and 2012. As sections are being approved, the corresponding commentary is being prepared in the current side-by-side format.

The committee recognizes that a complete document must be ready for public comment by early 2013. If gaps are found in the Code structure, changes cannot be postponed. Thus,

the activity level within Committee 318 remains quite intense.

Reference

1. Poston, R.W., and Dolan, C.W., "Reorganizing ACI 318," *Concrete International*, V. 30, No. 7, July 2008, pp. 57-61.

Selected for reader interest by the editors.



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