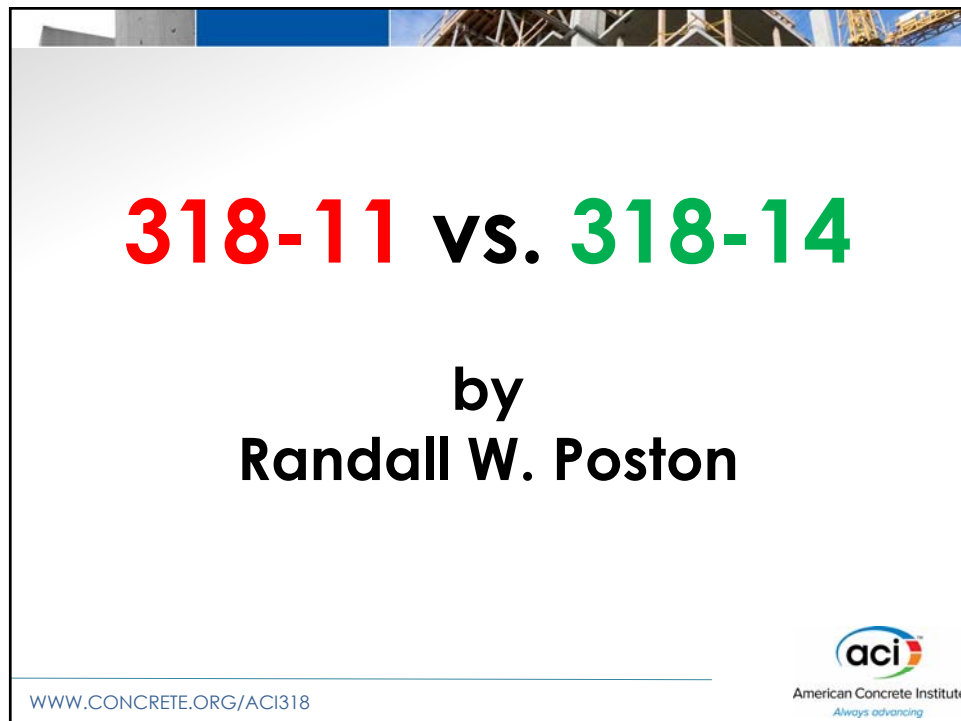
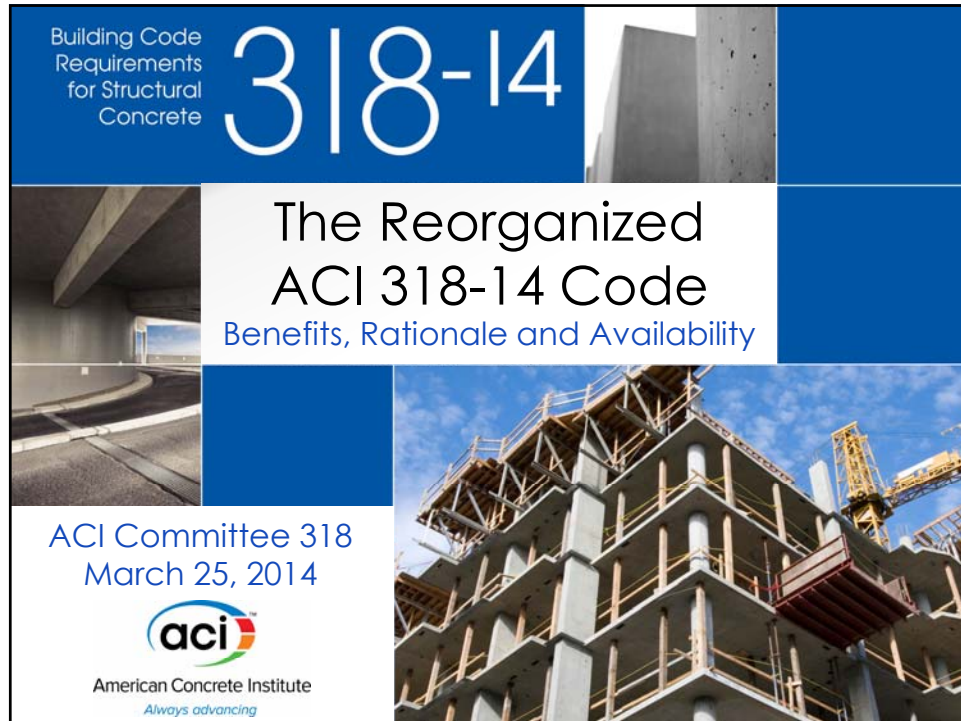




Overview of Presentation

- A brief history of ACI 318
- The rationale for reorganization
- How 318-14 is organized
- 318-14 style
- Available resources and process timetable

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History



- Founded in 1904
- HQ in Farmington Hills, Michigan, USA

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History

- 1910 – first code published: “Standard Building Regulations for the Use of Reinforced Concrete”
- Structural provisions assumed a working stress limit through 1956
- “Ultimate Strength” approach firmly established in 1971 edition.
- ACI 318 organization based on behavior of cast-in-place reinforced concrete

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Significant changes (since 1971)

- Development lengths
- Torsional strength
- Seismic design and detailing
- Integrity reinforcement
- Concrete exposure classes
- Strain-based strength reduction factors
- Anchoring to concrete

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History

- 1971 Code had 750 provisions
- 2011 Code has more than 2,500 provisions



ACI 318-11 compared to
ACI 318-71

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ACI 318 Committee



The diagram illustrates the composition of the ACI 318 Committee. It features a central photograph of a large conference room with many people seated around a long table. Red arrows point from six labels to specific individuals in the photo: 'Contractor' points to a person on the left; 'Structural Engineer' points to a person in the center; 'ACI 318 Chair' points to a person on the right; 'Building Official' points to a person on the far left; 'Materials Engineer' points to a person in the center; and 'University Researcher' points to a person on the right.

Contractor Structural Engineer ACI 318 Chair

Building Official Materials Engineer University Researcher

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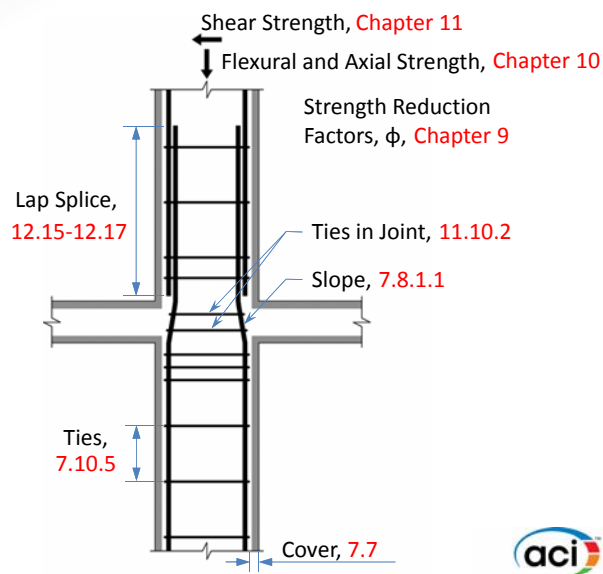
318 Organization Since 1971

- Chapters 7 – 12 are central to organization
 - Analysis
 - Serviceability (Deflections, Crack Control, etc.)
 - Strength (Flexure, Shear, etc.)
 - Related Reinforcement Details

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ACI 318-11 Organization



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318-11 Organization (since 1971)

- Specialty Chapters
 - Two-way Slabs (Ch 13)
 - Footings (Ch 15)
 - Precast (Ch 16)
 - Prestressed (Ch 18)
 - Seismic (Ch 21)

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Need to find a tool?



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ACI 318-14 Reorganization Process

- 2003: committee began discussion
- 2006: surveyed users, held focus groups / workshops
 - Engineers want all related information for a member's design and detailing easily located
 - Engineers want the code to be configured parallel to how they design members
- 2007: outline developed
- 2008: committee approved effort

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Major goals of reorganizing 318

- Find the information you need quickly
- Increase certainty that a design fully meets the Code
- "Clean the Garage!"

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And so the reorganization began...



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What does 318-14 look like?



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ACI 318-14 Organization



- General
- Systems
- Members
- Joints and Connections
- Toolbox
- Construction

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ACI 318-14 Organization

General Chapters

- General – Scope, Application, Interpretation
- Notation and Terminology
- Referenced Standards
- Concrete Design Properties
- Steel Design Properties

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ACI 318-14 Organization



- General
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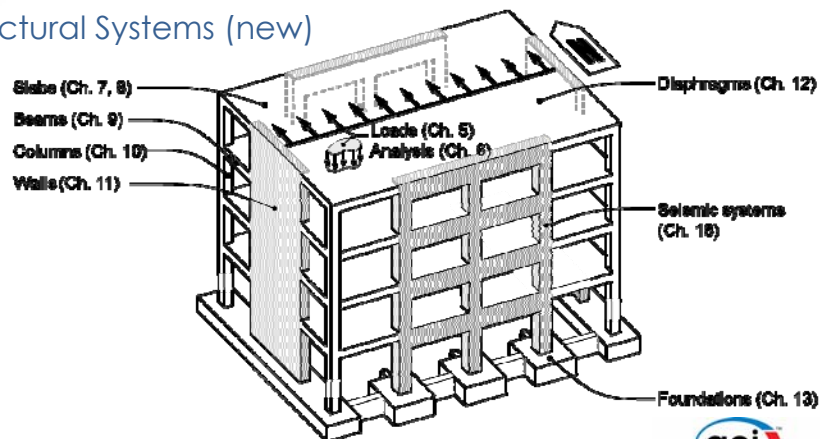
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ACI 318-14 Organization

System Chapters

- Structural Systems (new)



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ACI 318-14 Organization

System Chapters

- Structural Systems (new)
- Loads and Load Combinations
- Structural Analysis
- Earthquake Resistant Structures

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ACI 318-14 Organization



- General
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ACI 318-14 Organization

Members Chapters

- One-Way Slabs
- Two-Way Slabs
- Beams
- Columns
- Walls
- Diaphragms (new)
- Foundations
- Plain Concrete Members

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ACI 318-14 Organization

Example: Chapter 10 – Columns

- 10.1 Scope
- 10.2 General
- 10.3 Design Limits
- 10.4 Required Strength
- 10.5 Design Strength
- 10.6 Reinforcement Limits
- 10.7 Reinforcement Detailing



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ACI 318-14 Organization

Example:

Chapter 10 – Columns

- 10.1 Scope
- 10.2 General
- 10.3 Design Limits
- 10.4 Required Strength
- 10.5 Design Strength
- 10.6 Reinforcement Limits
- 10.7 Reinforcement Detailing

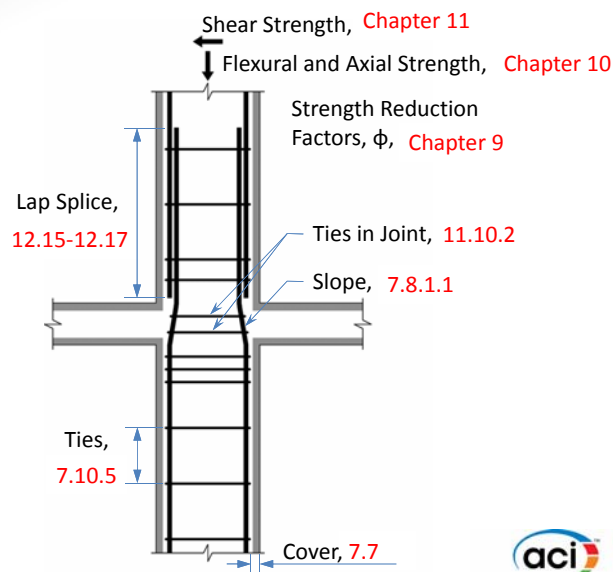
Chapter 9 – Beams

- 9.1 Scope
- 9.2 General
- 9.3 Design Limits
- 9.4 Required Strength
- 9.5 Design Strength
- 9.6 Reinforcement Limits
- 9.7 Reinforcement Detailing

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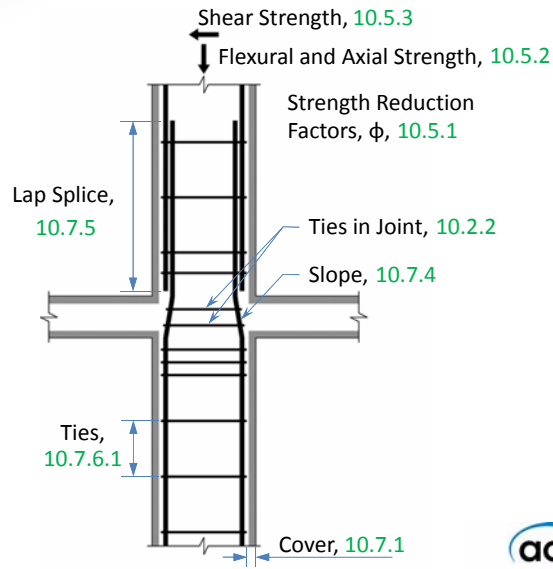
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ACI 318-14 Organization



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ACI 318-14 Organization



- General
- Systems
- Members
- Joints and Connections
- Toolbox
- Construction

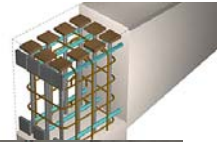
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ACI 318-14 Organization

Joints / Connections

- Beam-column and slab-column joints
- Connections between members
- Anchoring to concrete



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ACI 318-14 Organization



- General
- Systems
- Members
- Joints and Connections
- Toolbox
- Construction

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ACI 318-14 Organization

Toolbox Chapters

- Strength Reduction Factors
- Sectional Strength
- Strut-and-Tie
- Serviceability
- Reinforcement Details

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ACI 318-14 Organization

Member Chapter

9.5 — Design strength

9.5.2 — Moment

9.5.2.1 — If $P_u < 0.10f'_cA_g$, ϕM_n shall be calculated in accordance with 22.3.
If $P_u \geq 0.10f'_cA_g$, ϕM_n shall be calculated in accordance with 22.4.

Toolbox Chapter

22.3 — Moment strength...

22.4 — Axial strength or combined moment and axial strength...

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ACI 318-14 Organization



- General
- Systems
- Members
- Joints and Connections
- Toolbox
- Construction

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ACI 318-14 Organization

Chapter 26 – CONSTRUCTION DOCUMENTS AND INSPECTION

- 318 is written to the engineer, not the contractor.
- Construction requirements must be communicated on the construction documents.
- In 318-11, construction requirements are often located with the design requirement.
- In 318-14, all construction requirements are gathered together in Chapter 26.

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ACI 318-11 Language

21.9.9 — Construction joints

All construction joints in structural walls shall conform to 6.4 and contact surfaces shall be roughened as in 11.6.9.

6.4.3 — Construction joints shall be so made and located as not to impair the strength of the structure. Provision shall be made for transfer of shear and other forces through construction joints. See 11.6.9.

11.6.9 — When concrete is placed against previously hardened concrete, the interface for shear transfer shall be clean and free of laitance. If μ is assumed equal to 1.0 λ , interface shall be roughened to a full amplitude of approximately 1/4 in.

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ACI 318-14 Language

(draft) **26.4.7 – Joints in concrete**

26.4.7.1 – Design information:

- (a) Locations and details of construction, isolation and contraction joints if required by the design.
- (b) Provisions required for transfer of shear and other forces through construction joints.
- (c) Surface preparation requirements including intentional roughening.

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ACI 318-11 Style

7.6.7.1— Center-to-center spacing of pretensioning tendons at each end of a member shall be not less than **$4d_b$** for strands, or **$5d_b$** for wire, except that if specified compressive strength of concrete at time of initial prestress, **f_{ci}'** , is 4000 psi or more, minimum center-to-center spacing of strands shall be 1-3/4 in. for strands of 1/2 in. nominal diameter or smaller and 2 in. for strands of 0.6 in. nominal diameter. See also 3.3.2.

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ACI 318-14 Style

Same requirements in a table

Table 25.2.4 — Minimum center-to-center spacing of pretensioned strands at ends of members

f'_{ci} , psi	Nominal strand diameter in.	Minimum s	
< 4000	All	$4d_b$	(a)
≥ 4000	≤ 0.5 in.	1-3/4 in.	(b)
	0.6 in.	2 in.	(c)

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ACI 318-11 Style

Chapter 18 – Prestressed Concrete

18.1.2 — All provisions of this Code not specifically excluded, and not in conflict with provisions of Chapter 18, shall apply to prestressed concrete.

18.1.3 — The following provisions of this Code shall not apply to prestressed concrete, except as specifically noted: **Sections 6.4.4, 7.6.5, 8.12.2, 8.12.3, 8.12.4, 8.13, 10.5, 10.6, 10.9.1, and 10.9.2; Chapter 13; and Sections 14.3, 14.5, and 14.6, except that certain sections of 10.6 apply as noted in 18.4.4.**

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ACI 318-14 Style

- **9.6 — Reinforcement limits**
 - 9.6.1— Minimum flexural reinforcement in nonprestressed beams
 - 9.6.2 — Minimum flexural reinforcement in prestressed beams
- **9.7 — Reinforcement detailing**
 - 9.7.3 — Flexural reinforcement in nonprestressed beams
 - 9.7.4 — Flexural reinforcement in prestressed beams

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Benefits of ACI 318-14

- Organized from a designer's perspective
- Easier to find specific requirements
- Intuitive location of information
- Reduced cross references

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Benefits of ACI 318-14

- Tables improve speed of understanding
- Consistent language in text
- Single idea for each requirement

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Schedule to Publication

- Committee work ended October 2013
- Internal ACI review late fall 2013
- **Public comment period spring 2014**
- Committee response summer 2014
- Publication fall 2014



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Publication

- ACI 318-14 will be published in:
 - English
 - Spanish
 - Chinese
- ACI 318-14 will be published in:
 - US Customary units
 - SI units
- It will be available in a variety of formats, including:
 - Printed copy
 - Enhanced PDF
 - EPUB, MOBI

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Additional Resources

- Transition key – maps:
 - ACI 318-11 to ACI 318-14
 - ACI 318-14 to ACI 318-11
- ACI Reinforced Concrete Design Manual will be consistent with 318-14
- Online learning
- In-person seminars

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How To Get Involved:

- www.concrete.org/ACI318 for more information
- Review 318-14 during public discussion period
- Join the conversation on Twitter by using #ACI318 and #ConcreteCode 
- www.facebook.com/AmericanConcreteInstitute



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Heruclean Effort:

- 96,000 man-hours
- 46 man-years
- Over \$14 million in volunteer time

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Learning Objectives

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Learning Objectives

1. Provide a general overview of ACI 318-14
2. Highlight the organization of information within each member chapter of 318-14
3. Identify the benefits of the newly reorganized ACI 318-14 Code
4. Provide examples of additional information ACI will make available to assist in the transition to the new code

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Questions?

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