ASCE | CONTINUING EDUCATION

Designing Wood Structures Using the Latest Innovations

Purpose and Background

Wood-frame structures have been in circulation since the beginning of recorded civilization. Wood is readily available, easy to work with, has a high strength-to-weight ratio, and a comforting appeal. Design requirements have remained relatively consistent over multiple code cycles, but innovative uses and aggressive testing have prompted recent code changes to allow for timber construction that would have been previously unimaginable: 18-story structures, determinable fire-resistance values, and minimal environmental impact. Thanks to the concept of Mass Timber, architects and engineers are able to design tall wood-frame buildings that are easily competitive with other more conventional materials.

The purpose of this 2-day seminar is to illustrate methods of structural design for wood framing that utilize common materials with mass timber, such as cross-laminated timber (CLT), nail- laminated timber (NLT), and glue-laminated timber (GLT). Additionally, provisions of the 2018 International Building Code will be discussed with specific regard to the classification of timber structures (type of construction, allowable areas/heights) and of their fire-resistive capabilities, with and without added barriers. Numerical example problems, question/answer sessions, and a post-test will be used to illustrate concepts and to assess learning of attendees.

Seminar Instructor

DAVE K. ADAMS, P.E., S.E., M.ASCE has been practicing structural engineering since graduation from the University of California, San Diego in 1990. He is currently a Principal Associate with BWE in San Diego, CA, and continues to serve as a subject matter expert for the California engineer's licensing board (BPELSG). He regularly designs and details structures of all materials and collaborates with other engineers and draftspersons. Dave also investigates structural failures or damage for a variety of building types and has written comprehensive reports to summarize findings and retrofit recommendation. Mr. Adams is actively involved in the engineering community through committee membership, paper publication, and student mentoring.

- **For group training, contact John Wyrick (JWyrick@asce.org) or Stephanie Tomlinson (STomlinson@asce.org)**

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Summary Outline (1.4 CEUs)

Session 1: Timber Buildings per the 2018 International Building Code
- Historical uses and capabilities of timber construction
- Available type of construction classifications
- Allowable area, height, and potential zoning issues

Session 2: Wood Design 101
- Species, grades, design values
- Beams and columns
- Connections
- Lateral force resisting systems

Session 3: Introduction to Mass Timber Construction
- Definitions and project examples
- Harvesting and manufacturing
- Testing and research
- Environmental effects
- Comparisons

Session 4: Designing CLT, NLT, and GLT for Gravity Loads
- Load requirements and combinations
- Strength requirements and design
- Serviceability requirements and design

Session 5: Designing CLT, NLT, and GLT for Lateral Loads
- Load requirements and combinations
- Horizontal diaphragms
- Shear walls

Session 6: Designing Connections for CLT, NLT, and GLT
- Adhesives
- Nails and screws
- Lag screws and bolts
- Other types

Session 7: Determining Fire Resistance of Wood Assemblies
- Acceptance testing
- Calculated fire resistance per IBC Chapter 7
- Assemblies and other selections

Session 8: Assessment and Retrofit of Existing Wood Structures
- International Existing Buildings Code
- Assessment
- Retrofit options
- Inspections and testing

Seminar Benefits

1. An up-to-date presentation of code requirements for timber buildings
2. Summary of relevant testing of mass timber construction elements
3. Numerical design examples
4. Illustration of fire-resistant capabilities of mass timber construction

Learning Outcomes

1. Calculate the resistance of common mass timber elements to code-required loads
2. Understand the environmental benefit of mass timber construction
3. Learn how to integrate mass timber elements into a building design
4. Evaluate existing and proposed tall timber structures
5. Determine the fire-resistance of wood framing

Who Should Attend?

- Structural engineers
- Architects
- Building officials
- Educators
- Students

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