

Practical, step-by-step instruction to help you understand and solve routine building structural problems...

Fundamentals of Structural Design for Architects, Builders and Technicians

Including Seismic and Wind Applications

**March 27-31, 2006
Las Vegas, Nevada**

Basic knowledge for

- ✓ **Building inspectors, plan reviewers**
- ✓ **Designers, drafters, technicians**
- ✓ **Materials suppliers**
- ✓ **Architectural interns**
- ✓ **Builders/constructors**

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**COLLEGE OF ENGINEERING
UNIVERSITY OF WISCONSIN-MADISON**

**Department of Engineering Professional Development
432 North Lake Street · Madison, Wisconsin 53706**

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COLLEGE OF ENGINEERING ■ DEPARTMENT OF ENGINEERING PROFESSIONAL DEVELOPMENT

Fundamentals of Structural Design for Architects, Builders and Technicians

Including Seismic and Wind Applications

Practical, step-by-step instruction to help you understand and solve routine building structural problems

**March 27-31, 2006
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Fundamentals of Structural Design for Architects, Builders and Technicians

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March 27–31, 2006 in Las Vegas, Nevada

Basic, Practical Knowledge

This course, a more introductory version of our popular *Structural Design for Non-Structural Engineers* course, provides additional background in structural analysis as well as the procedures and tools used in the design of common structural configurations. We will give you a basic, practical understanding of how beams, columns, frames and connections are designed and how materials such as masonry, steel, concrete and wood behave, particularly in building configurations.

You will learn to design and select simple structural systems and components that are common to all design practice. You will also learn to identify those situations where the assistance of a structural engineer may be necessary.

An Emphasis on Fundamentals

By participating you will

- increase your understanding of forces and how to use them to solve simple beam, column, truss and frame problems
- learn how to estimate dead, live, seismic, wind and other loading situations and where to find load information
- construct free-body, shear and moment diagrams and learn how to use them to size and select members
- study the basics of strength of materials
- learn the practical aspects of centroids, moment of inertia, section modulus and radius of gyration and why these properties are important in beam and column selection

Focus on Masonry, Steel, Concrete and Wood

This course introduces you to the current codes and standards that govern structural design, including the structural provisions of the International Building Code (IBC 2003). After an initial focus on fundamentals, your learning will progress to actual design as you devote approximately one day each to structures of steel, concrete, masonry and wood construction.

Your one-day focus on **steel** will give you the opportunity to

- study the American Institute of Steel Construction code standards and manual
- learn how codes are used to design steel beams, columns and connections
- assess both bolted and welded connections
- review seismic resistance of steel bracing schemes and steel diaphragms

Your day-long consideration of **reinforced concrete** will provide practical information and approaches for

- footings and foundation walls
- columns and beams
- slabs on grade
- shear walls and resistance to overturning

You will learn how to select reinforcing steel for beams and columns and how to design for simple shear.

Your one-day session on **wood** will increase your understanding of this material's properties and structural capability. You will learn about

- sizing floor joists, roof rafters and studs
- the capacity of nails and bolts
- design of plywood diaphragms and shear walls for lateral load resistance
- manufactured wood products and their strength capacities

You will also learn about **structural masonry** construction using concrete block and brick. Topics considered include horizontal and vertical reinforcing, pilasters and expansion joints.

Who Should Attend

This practical five-day course will assist technical personnel who need to know more about structural design, particularly for buildings. Past attendees have included technical support staff in design, construction, inspection and industry and also building designers.

Architectural License Exam Preparation

Although *Fundamentals of Structural Design for Architects, Builders and Technicians* is not intended as a "prep" course, intern architects have found the course to be of particular benefit as they prepared for the structural sections of the exam. Past attendees have said the course boosted their professional confidence with structural design and helped them to pass the exam.

Please Note: We suggest that you bring a calculator for use during in-class problem-solving sessions.

Prerequisites and Alternative Course

You should be familiar with geometry and trigonometric relations and be able to solve simple algebraic formulas. You should also be familiar with the terminology and methods of construction used in masonry, steel, concrete and wood.

If you have an engineering background and require only a review of statics and strength of materials, you might want to consider attending *Structural Design for Non-Structural Engineers* (Course #H217), which is a day shorter and also offered the same week at the same location. If you have any questions regarding which course will best suit your needs, please call the program director, Bruce Kieffer, toll free 800-462-0876.

Method of Instruction

Your instructors provide extensive notes in their topical areas, minimizing note taking and allowing you to concentrate fully on the presentations. Comfortably paced, step-by-step instruction throughout the course will provide you the maximum opportunity to learn. Come prepared to ask questions and discuss those particular structural problems and situations you may have encountered previously. Our experienced instructors will share practical information and approaches that you can put to work immediately.

Course outline inside...

Fundamentals of Structural Design for Architects, Builders and Technicians

Including Seismic and Wind Applications

Course Outline

Monday, March 27

8:00 Registration

The Palace Station Hotel and Casino
2411 West Sahara Avenue
Las Vegas, Nevada

8:20 Welcome and Introduction

Bruce Kieffer
Program Director
University of Wisconsin–Madison

Morning Session:

Structural Analysis

- Statics: force systems
- Equilibrium
- Trusses
- Columns

Bruce Kieffer

Afternoon Session:

Structural Analysis (continued)

- Dead loads
- Live loads
- Seismic and wind loads
- Miscellaneous loads
- Code provisions
- Case study project presentation

Bruce Kieffer

Tuesday, March 28

Morning Session:

Strength of Materials

- Shear diagrams
- Moment diagrams
- Beams
- Determinate vs. indeterminate structures
- Deflection
- Moment of inertia
- Section modulus
- Radius of gyration
- Composite construction
- Buckling
- Allowable stresses in tension; compression; shear and bending

Bruce Kieffer

Afternoon Session:

Structural Steel Design

- Properties and allowable stresses
- Materials
- AISC codes: LRFD and ASD application
- Beams
- Columns

Thomas Whittow

Wednesday, March 29

Morning Session:

Structural Steel Design (continued)

- Beam columns
- Trusses
- Bracing for lateral loads
- Connections
- Design examples

Thomas Whittow

Afternoon Session:

Structural Design of Wood Systems

- Properties
- Allowable stresses
- Materials
- National Design Specifications
- Beam-like members
- Column-like members

Michael Felker

Thursday, March 30

Morning Session:

Wood Systems Design (continued)

- Plywood
 - diaphragms
 - composite construction
- Manufactured products
 - roof and floor trusses
 - glue-lam members
 - laminated products
 - particle and wafer board
- Connectors
 - bolts; screws; nails
 - manufactured products
- Design examples

Michael Felker

Afternoon Session:

Reinforced Concrete Design

- Material properties and allowable stresses
- ACI code provisions
- Beams, columns, slabs

Ziad Salameh

Friday, March 31

Morning Session:

Reinforced Concrete Design (continued)

- Footing design
- Foundation and retaining walls
- Anchorage into concrete
- Design examples

Ziad Salameh

Afternoon Session:

Masonry Systems Design

- Masonry materials
- Bearing walls
- Non-bearing walls
- Shear walls
- Reinforced masonry
- Building with masonry

Ziad Salameh

4:00 Final Adjournment

Course Schedule

Course registration will be at 8:00 a.m. on Monday, March 27, at The Palace Station Hotel and Casino, 2411 West Sahara Avenue, Las Vegas, Nevada. Sessions will begin at 8:30 a.m. on Monday and at 8:00 a.m. Tuesday through Friday. Afternoon sessions will be from 1:00 to 5:00, except on Friday, when the course will adjourn at 4:00 p.m. The daily schedule will include midmorning and midafternoon refreshment breaks and lunch at noon.

Your Instructors

Michael Felker is vice president and structural discipline coordinator for Strand Associates Inc. He has been with Strand since 1978. Mr. Felker's experience includes structural design of wood, concrete and steel buildings and bridges, evaluation and remodeling of existing buildings, project management, construction administration, and construction observation. He is also an instructor for continuing education courses at the University of Wisconsin–Madison. Mr. Felker has been licensed as a PE in Wisconsin and a SE in Illinois since 1981.

Bruce D. Kieffer, architect, is a program director with the University of Wisconsin–Madison, Department of Engineering Professional Development. Prior to joining the department, where he manages programs in structures, construction and architecture, he worked for 30 years in private practice and as a faculty member teaching architectural design, engineering and technology.

Dr. Ziad M. Salameh PE, senior structural engineer at INSPEC, Inc., has more than 15 years of experience in structural designs and investigations, repair recommendations, and construction inspection. His work has involved civil, bridge, commercial, industrial, municipal, residential, and wastewater structures. He is also adjunct professor of building structural systems at the School of Architecture and Urban Planning, University of Wisconsin–Milwaukee.

Thomas Whittow PE is a structural engineer and partner at Computerized Structural Design, Inc. (CSD) of Milwaukee, Wisconsin. He has additional experience as a senior engineer with several large manufacturing firms. His experience includes teaching college-level and continuing professional engineering courses at the University of Wisconsin–Madison.

For Related Course Descriptions

<http://epd.engr.wisc.edu/catalogs/structural.lasso>

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For details on these upcoming courses, call program director Bruce Kieffer at 800-462-0876. You can also fax us at 608-263-3160, e-mail kieffer@engr.wisc.edu, check our Web site at <http://epd.engr.wisc.edu/catalogs/structural.lasso>, or write to Engineering Professional Development, 432 North Lake Street, Madison, Wisconsin 53706

Fundamentals of Seismic Design
February 20–22, 2006, Madison, WI
Course #G197

Structural Bracing for Lateral Loads and Stability
February 23–24, 2006, Madison, WI
Course #G198

Structural Design for Non-Structural Engineers
March 27–31, 2006, Las Vegas, NV
Course #H217

Design Loads for Structures
May 8–9, 2006, Madison, WI
Course #H456

Structural Steel Connections
May 10–11, 2006, Madison, WI
Course #H457

Four Easy Ways to Enroll

Need to Know More?

Call toll free **800-462-0876** and ask for

Program Director:

Bruce D. Kieffer
608-262-2624
kieffer@engr.wisc.edu

Program Assistant:

Debbie Benell
608-263-7428
benell@engr.wisc.edu

Or e-mail custserv@epd.engr.wisc.edu

General Information

Fee of \$1295 Covers Notebook and other course materials, break refreshments, lunches, and certificate.

Cancellation If you cannot attend, please notify us by March 20, and we will refund your fee. Cancellations received after that date and no-shows are subject to a \$150 administrative fee. You may enroll a substitute at any time before the course starts.

Location The course will be held at The Palace Station Hotel and Casino, 2411 West Sahara Avenue, Las Vegas, Nevada. If you must be contacted during the course, phone messages may be left for you at 702-367-2441.

Accommodations We have reserved a block of sleeping rooms for course participants at The Palace Station Hotel and Casino, 2411 West Sahara Avenue, Las Vegas, Nevada. The room rates are \$69/single for Courtyard and \$89/single for Tower. To reserve a room at The Palace Station Hotel and Casino, call 800-634-3101 by February 23.

Earn Continuing Education Credits By participating in this course, you can earn 3.0 Continuing Education Units (CEU), 30 AIA Learning Units (LU) or 30 Professional Development Hours (PDH).



Phone:
800-462-0876 or
608-262-1299 (TDD 265-2370)



Internet:
<http://epd.engr.wisc.edu/webH216>

Mail to:

Engineering Registration, The Pyle Center
702 Langdon Street, Dept. 108
Madison, Wisconsin 53706



Fax:

800-442-4214 or 608-265-3448



Course Information

- Please enroll me in **Fundamentals of Structural Design for Architects, Builders and Technicians Course #H216** March 27–31, 2006 in Las Vegas, NV Fee: \$1295
- I cannot attend at this time. Please send me brochures on future courses.

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