

Structural Engineering Videos Available From ASCE

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Wind Protective Design

This 90-minute video reviews the characteristics of severe wind storms, and proposes strategies for achieving wind protective designs for commercial, industrial, and residential buildings. Subjects covered include: the nature of wind; wind-structure interaction; hurricanes; designing for hurricanes; tornadoes; designing for Tornadoes.

Price \$135 M/ \$165 NM; 0.15 CEU's.

Earthquake Protective Design

In this 90-minute video, leading experts on seismic design examine the causes of earthquakes, techniques to evaluate the seismic performance of new and existing structures, and strategies to reduce the risk of loss due to earthquakes. Subjects covered include: the National Earthquake Hazards Reduction Program (NEHRP);

strategies to reduce the risk of loss due to earthquakes; causes of earthquakes and earthquake effects; response of buildings to earthquake effects; earthquake hazard maps; basic structural dynamics; building code approach to seismic design of new buildings; evaluation and upgrade of existing buildings; innovative systems.

Price \$135 M/ \$165 NM; 0.15 CEU's.

Design and Construction Guidance for Community Shelters

This one-hour video is essential for structural engineers, building officials, emergency management engineers, architects, critical facilities engineering staff, and school designers/engineers. Subjects covered include: refuge area evaluation checklists; a benefit-cost model for evaluating the financial aspect of shelter planning and design; wind loads for the structural system and for exterior components and cladding; the impact of windborne debris; the design of window and door systems; flood and seismic hazards; building code issues such as shelter occupancy, egress, fire safety, ADA, and other shelter issues.

Price \$135 M/ \$165 NM; 0.15 CEU's.

Civil Engineers Define a New Body of Knowledge for the 21st Century

ASCE's Committee on the Academic Prerequisites for the Professional Practice of Civil Engineering developed the recommended new Body of Knowledge that will serve as the foundation for the education of civil engineers in the future. "As the steward of the civil engineering profession, ASCE must lead the development and implementation of this new educational model," said ASCE Task Committee Chair Jeffrey S. Russell, Ph.D., "The current four-year bachelor's degree is becoming inadequate formal preparation for the practice of civil engineering in the 21st century."

The first of any engineering discipline to develop a proposal to elevate

educational prerequisites for future practicing engineers, the report recommends that a graduate degree or the equivalent of 30 credits, and practical experience be required in addition to an undergraduate degree before a civil engineer can sit for the licensure exam and practice professionally. The plan will lead to the revision of current undergraduate and graduate programs to reflect the basic skills and knowledge that will be expected of professional civil engineers, and may eventually lead to the creation of new programs. The Body of Knowledge is developed to be flexible in how future civil engineering students pursue their education.

New Publications

Assessment of Performance of Vital
Long-Span Bridges in the United States
ISBN: 0-7844-0710-X

This book describes the types and levels of assessments necessary for capturing the lifetime performance of long-span bridges, and emphasizes the distinction between performance and condition assessments. Long-span bridges are a living tribute to the engineering feats and accomplishments of their designers and builders. This report contains up-to-date engineering assessment concepts, elaborates on some past catastrophic failures, and relates the lack of engineering performance assessments in these case histories. The elements and parameters, which may govern whether these special bridges have the sustainability to perform well for long-term serviceability and during extreme events, are discussed.

Bridge engineers who are involved in preserving long-span bridges, and concerned with their vulnerability and weakness, will find this book of interest for future load and force scenarios.

Life-Cycle Performance of
Deteriorating Structures: Assessment,
Design, and Management

ISBN: 0-7844-0707-X

Published: 2004

Life-Cycle Performance of Deteriorating Structures comprises most of the papers presented at the joint event of the Third IABMAS (International Association for Bridge Maintenance and Safety) Workshop on Life-Cycle Cost Analysis and Design of Civil Infrastructure Systems and the JCSS (Joint Committee on Structural Safety) Workshop on Probabilistic Modeling of Deterioration Processes in Concrete Structures, held in Lausanne, Switzerland, March 24-26, 2003. The 43 papers, including four keynote lectures and the statements and conclusions, cover a wide range of studies on life-cycle performance of deteriorating structures. Contributions are from a range of internationally recognized researchers and practicing engineers from the Americas, Asia, Australia and Europe.

To order these and other publications,
go to: www.pubs.asce.org,
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Papers in the March Issue of Bridge Engineering

Bruce E. Peterson, Editor

This issue of the Journal of Bridge Engineering begins with two companion papers investigating the Roebling Suspension Bridge across the Ohio River. "Roebling Suspension Bridge I: FE Model and Free Vibration Response" and "Roebling Suspension Bridge II: Ambient Testing and Live Load Response" by Ren, Blandford, and Harik, both detail the investigation to assess the bridge's load carrying capacity, and compare this capacity with the current standards of safety. The first paper focuses on the analytical investigation while the second describes the experimental investigation. A dynamic based evaluation is used, combining the finite element analysis with the field testing. The results showed that the cable stress stiffening plays an important role in both the static and dynamic responses of the bridge. Those results will be used to provide structural information to assist in the preservation of this historic structure.

The next three papers describe work in the area of decks. "Behavior of Field Splice Details in Pre-Cast Concrete Filled Steel Grid Bridge Deck", by Earls and Johnston, presents the investigation of two new deck splice details for use with filled grid bridge deck. These types of decks are increasingly being used for bridge deck replacements due to their light weight and shorter erection times during limited traffic closures. The paper summarizes the results of the experimental and analytical studies that were performed.

Broquet, Bailey, Fafard, and Brühwiler in "Dynamic Behavior of Deck Slabs of Concrete Road Bridges" provide their finite element analysis findings in the dynamic effect of traffic on deck slabs. They determined that the type of bridge cross section does not have a significant influence on the deck slab behavior.

The final deck paper, "Wheel Load Distribution in Simply Supported Concrete Slab Bridges" by Mabsout, Tarhini, Jabakhanji, and Awwad, presents the results of a parametric study of the wheel load distribution in one span, simply supported, multi-lane reinforced

concrete slab bridges. Using the finite element method to investigate the effect of span length, slab width, and wheel load conditions, the study compares the results to the AASHTO suggested design values.

"Seismic Response of Isolated Bridges" by Jangid, is the first of two papers on dynamics. The specific purpose of the study was to assess the effects of the bi-directional interaction of restoring forces of isolation bearings. The study showed that the bi-directional interaction of the restoring forces of the lead-rubber bearings has considerable effects on the seismic response of isolated bridges and if these interaction effects are ignored, the peak bearing displacements will be underestimated.

The second paper on dynamics by Chen and Chen, "Timoshenko Beam with Tuned Mass Dampers to Moving Loads", presents the structural analysis of a Timoshenko beam system with tuned mass dampers under moving load excitation. The author proposes a simplified two-degree of freedom system based on the first mode of Timoshenko beam to design the tuned mass dampers. The paper provides a practical example of an elevated railway and the effectiveness of the tuned mass dampers for vibrational control.

The final four papers in this issue cover a variety of subjects. First, "Shear Lag Effect in Simply-Supported Prestressed Concrete Box Girder" by Chang provides the derivation of shear lag coefficient for simply-supported prestressed concrete box girders under dead load and movable loads. Charts are prepared to predict the shear lag coefficient for live load and examples are worked out for illustrative purposes.

Reed and Peterman in "Evaluation of Prestressed Concrete Bridge Girders Strengthened With Carbon FRP Sheets" detail the use of carbon fiber reinforced polymer sheets to repair and strengthen prestressed concrete bridge girders in flexure and shear. Using specimens removed from an overloaded bridge, the specimens are repaired, strengthened, and

evaluated for the effectiveness of the strengthening. The investigation found increases in both the shear and flexural capacities. However, the strengthening did not prevent bond failures between the strands and concrete.

Arsoy, Duncan, and Barker in "Behavior of a Semi-Integral Bridge Abutment under Static and Temperature-Induced Cyclic Loading" present the results of an experimental study of semi-integral bridge abutments. The paper focuses on the potential problems with a particular detail, the rotational characteristics of the semi-integral abutments and the ability of the specimens to withstand cyclic loading from temperature variations. The results showed that semi-integral abutments can significantly reduce the moments transferred from the superstructure to the foundation piles. In addition, the tests showed that semi-integral abutments can tolerate the number of displacement cycles that a bridge would be expected to experience during its serviceable life.

The final paper in this issue, "Effect of Common Cause Failures on Indirect Costs" by Adey, Hajdin, and Brühwiler, looks at the next generation of bridge management systems which will take into consideration multiple hazard scenarios in addition to traffic loading and structural deterioration.

17th ASCE Engineering Mechanics Conference (EM2004)

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University of Delaware in Newark,
DE Organized by the Stability
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Mechanics Division of ASCE

Conference web site:

www.ce.udel.edu/em2004/,
click on keyword "stability."

