Nonlinear Finite Element Analysis of Composite and Reinforced Concrete Beams-Xiaoshan Lin

2020-02-03 Nonlinear Finite Element Analysis of Composite and Reinforced Concrete Beams presents advanced methods and techniques for the analysis of composite and FRP reinforced
concrete beams. The title introduces detailed numerical modeling methods and the modeling of the structural behavior of composite beams, including critical interfacial bond-slip behavior. It covers a new family of composite beam elements developed by the authors. Other sections cover nonlinear finite element analysis procedures and the numerical modeling techniques used in commercial finite element software that will be of particular interest to engineers and researchers executing numerical simulations. Gives advanced methods and techniques for the analysis of composite and fiber Reinforced Plastic (FRP) and reinforced concrete beams. Presents new composite beam elements developed by the authors. Introduces numerical techniques for the development of effective finite element models using commercial software. Discusses the critical issues encountered in structural analysis. Maintains a clear focus on advanced numerical modeling.

Thermal Stress Analysis of Composite Beams, Plates and Shells: Computational Modelling and Applications presents classic and advanced thermal stress topics in a cutting-edge review of this critical area, tackling subjects that have little coverage in existing resources. It includes discussions of complex problems, such as multi-layered cases using modern advanced computational and vibrational methods. Authors Carrera and Fazzolari begin with a review of the fundamentals of thermoelasticity and thermal stress analysis relating to advanced structures and the basic mechanics of beams, plates, and shells, making the book a self-contained reference. More challenging topics are then addressed, including anisotropic thermal stress structures, static and dynamic responses of coupled and uncoupled thermoelastic problems, thermal buckling, and post-buckling behavior of thermally loaded structures, and thermal effects on panel flutter phenomena, amongst others. Provides an overview of critical thermal stress theory and its relation to beams, plates, and shells, from classical concepts to the latest advanced theories. Appeals to those studying...
thermoelasticity, thermoelastics, stress analysis, multilayered structures, computational methods, buckling, static response, and dynamic response. Includes the authors' unified formulation (UF) theory, along with cutting-edge topics that receive little coverage in other references. Covers metallic and composite structures, including a complete analysis and sample problems of layered structures, considering both mesh and meshless methods. Presents a valuable resource for those working on thermal stress problems in mechanical, civil, and aerospace engineering settings.

Nonlinear Composite Beam Theory—Dewey H. Hodges 2006
From an authoritative expert whose work on modern helicopter rotor blade analysis has spanned over three decades, comes the first consistent and rigorous presentation of beam theory. Beginning with an overview of the theory developed over the last 60 years, Dr. Hodges addresses the kinematics of beam deformation, provides a simple way to characterize strain in an initially curved and twisted beam, and offers cross-sectional analysis for beams with arbitrary cross sections and composed of arbitrary materials. He goes on to present a way to accurately recover all components of cross-sectional strain and stress before providing a natural one-dimensional (1-D) theory of beams. Sample results for both cross-sectional and 1-D analysis are presented as is a parallel treatment for thin-walled beams.

Analysis and Design of Steel and Composite Structures—Qing Quan Liang 2018-10-08
Steel and composite steel-concrete structures are widely used in modern bridges, buildings, sport stadia, towers, and offshore structures. Analysis and Design of Steel and Composite Structures offers a comprehensive introduction to the analysis and design of both steel and composite structures. It describes the fundamental behavior of steel and composite members and structures, as well as the current design criteria and procedures given in Australian standards AS/NZS 1170, AS 4100, AS 2327.1, Eurocode 4, and AISC-LRFD specifications. Featuring numerous step-by-step examples that clearly illustrate the detailed analysis and design of steel and
composite members and connections, this practical and easy-to-understand text: Covers plates, members, connections, beams, frames, slabs, columns, and beam-columns Considers bending, axial load, compression, tension, and design for strength and serviceability Incorporates the author’s latest research on composite members Analysis and Design of Steel and Composite Structures is an essential course textbook on steel and composite structures for undergraduate and graduate students of structural and civil engineering, and an indispensable resource for practising structural and civil engineers and academic researchers. It provides a sound understanding of the behavior of structural members and systems. Design and Analysis of Composite Structures-Christos Kassapoglou 2013-04-23 New edition updated with additional exercises and two newchapters. Design and Analysis of Composite Structures: WithApplications to Aerospace Structures, 2nd Edition builds on the first edition and includes two new chapters on compositefittings and the design of a composite panel, as well additionalexercises. The book enables graduate students and engineers to generate meaningful and robust designs of complexcomposite structures. A compilation of analysis and design methods for structural components made of advanced composites, it begins with simple parts such as skins and stiffeners and progresses through to applications such as entire components of fuselages and wings. It provides a link between theory and day-to-day design practice, using theory to derive solutions that are applicable to specific structures and structural details used in industry. Starting with the basic mathematical derivation followed by simplifications used in real-world design, Design and Analysis of Composite Structures: With Applications to Aerospace Structures, 2nd Edition presents the level of accuracy and range of applicability of each method along with design guidelines derived from experience combined with analysis. The author solves in detail examples taken from actual applications to show how the concepts can be applied, solving the same design problem.
with different methods based on different drivers (e.g. cost or weight) to show how the final configuration changes as the requirements and approach change. Each chapter is followed by exercises that represent specific design problems often encountered in the aerospace industry but which are also applicable in the automotive, marine, and construction industries. Updated to include additional exercises, that represent real design problems encountered in the aerospace industry, but which are also applicable in the automotive, marine, and construction industries. Includes two new chapters. One on composite fittings and another on application and the design of a composite panel. Provides a toolkit of analysis and design methods that enable engineers and graduate students to generate meaningful and robust designs of complex composite structures. Provides solutions that can be used in optimization schemes without having to run finite element models at each iteration; thus speeding up the design process and allowing the examination of many more alternatives than traditional approaches.

Supported by a complete set of lecture slides and solutions to the exercises hosted on a companion website for instructors. An invaluable resource for Engineers and graduate students in aerospace engineering as well as Graduate students and engineers in mechanical, civil and marine engineering.

Finite Element Analysis for Composite Structures - L.T. Tenek 1997-12-31 This book is an adventure into the computer analysis of three dimensional composite structures using the finite element method (FEM). It is designed for Universities, for advanced undergraduates, for graduates, for researchers, and for practising engineers in industry. The text advances gradually from the analysis of simple beams to arbitrary anisotropic and composite plates and shells; it treats both linear and nonlinear behavior. Once the basic philosophy of the method is understood, the reader may expand its application and modify the computer programs to suit particular needs. The book arose from four years research at the University of Stuttgart,
Germany. We present the theory and computer programs concisely and systematically so that they can be used both for teaching and applications. We have tried to make the book simple and clear, and to show the underlying physical and mathematical ideas. The FEM has been in existence for more than 50 years. One of the authors, John Argyris, invented this technique in World War II in the course of the check on the analysis of the swept back wing of the twin engined Meteor Jet Fighter. In this work, he also consistently applied matrix calculus and introduced triangular membrane elements in conjunction with two new definitions of triangular stresses and strains which are now known as the component and total measures. In fact, he was responsible for the original formulation of the matrix force and displacement methods, the forerunners of the FEM. Advanced Mechanics of Materials and Applied Elasticity-Ansel C. Ugural 2011-06-21 This systematic exploration of real-world stress analysis has been completely updated to reflect state-of-the-art methods and applications now used in aeronautical, civil, and mechanical engineering, and engineering mechanics. Distinguished by its exceptional visual interpretations of solutions, Advanced Mechanics of Materials and Applied Elasticity offers in-depth coverage for both students and engineers. The authors carefully balance comprehensive treatments of solid mechanics, elasticity, and computer-oriented numerical methods—preparing readers for both advanced study and professional practice in design and analysis. This major revision contains many new, fully reworked, illustrative examples and an updated problem set—including many problems taken directly from modern practice. It offers extensive content improvements throughout, beginning with an all-new introductory chapter on the fundamentals of materials mechanics and elasticity. Readers will find new and updated coverage of plastic behavior, three-dimensional Mohr’s circles, energy and variational methods, materials, beams, failure criteria, fracture mechanics, compound cylinders, shrink fits, buckling of stepped columns, common shell
types, and many other topics. The authors present significantly expanded and updated coverage of stress concentration factors and contact stress developments. Finally, they fully introduce computer-oriented approaches in a comprehensive new chapter on the finite element method.

Vibration of Laminated Shells and Plates-Mohamad Subhi Qatu 2004-02-16 Vibrations drive many engineering designs in today’s engineering environment. There has been an enormous amount of research into this area of research over the last decade. This book documents some of the latest research in the field of vibration of composite shells and plates filling a much-needed gap in the market. Laminated composite shells have many engineering applications including aerospace, mechanical, marine and automotive engineering. This book makes an ideal reference for researchers and practicing engineers alike. The first book of its kind Documents 10 years of research in the field of composite shells Many Engineering applications

The behavior of structures composed of composite materials-Jack R. Vinson 2012-12-06 While currently available texts dealing with the subject of high performance composite materials touch upon a spectra of topics such as mechanical metallurgy, physical metallurgy, micromechanics and macro mechanics of such systems, it is the specific purpose of this text to examine elements of the mechanics of structural components composed of composite materials. This text is intended for use in training engineers in this new technology and rational thought processes necessary to develop a better understanding of the behavior of such material systems for use as structural components. The concepts are further exploited in terms of the structural format and development to which the book is dedicated. To this end the development progresses systematically by first introducing the notion and concepts of what these new material classes are, the fabrication processes involved and their unique features relative to conventional monolithic materials. Such introductory remarks, while far too short in texts of this type, appear
necessary as a precursor for engineers to develop a better understanding for design purposes of both the threshold limits to which the properties of such systems can be pushed as well as the practical limitations on their manufacture. Following these introductory remarks, an in-depth discussion of the important differences between composites and conventional monolithic material types is discussed in terms of developing the concepts associated with directional material properties.

Structural Analysis of Composite Beam Systems-
Albert Skudra 1991-01-01 The use of RP/composite materials in load-bearing applications requires an in-depth understanding of their structural mechanics. This book provides a very detailed, quantified presentation of this important subject.

Modeling of Composite Beams and Plates for Static and Dynamic Analysis-
Thin-Walled Composite Beams-Liviu Librescu 2006-01-15 There has been a growing interest in the foundation of the theory of thin-walled composite beams and of their incorporation in aeronautical/aerospace, automotive, helicopter and turbomachinery rotor blades, mechanical, civil and naval constructions in the last two decades or so. The proliferation of the specialized literature, mainly in the form of journal/proceedings papers, and the activity in terms of workshops devoted to this topic attest this interest. A decisive factor that has fueled this growing activity was generated by high diversity and severity of demands and operating conditions imposed on structural elements involved in the advanced technology. In order to be able to survive and fulfill their mission in the extreme environmental conditions in which they operate, new materials and new structural paradigms are required. The new exotic structures have to provide higher performances, unattainable by the classical structures built of traditional materials. The advent of advanced composite materials, of smart materials and functionally graded materials (FGMs), have constituted the strongest stimuli for such developments. Moreover, their incorporation is likely to expand the use and capabilities of
thin-walled beam structures. The new and stringent requirements imposed on aeronautical/aerospace, turbomachinery and shaft structural systems will be best met by such new types of material structures.

Advanced Mechanics of Composite Materials and Structural Elements - Valery Vasiliev 2013-06-19

Advanced Mechanics of Composite Materials and Structural Elements analyzes contemporary theoretical models at the micro- and macro levels of material structure. Its coverage of practical methods and approaches, experimental results, and optimization of composite material properties and structural component performance can be put to practical use by researchers and engineers. The third edition of the book consists of twelve chapters progressively covering all structural levels of composite materials from their constituents through elementary plies and layers to laminates and laminated composite structural elements. All-new coverage of beams, plates and shells adds significant currency to researchers.

Composite materials have been the basis of many significant breakthroughs in industrial applications, particularly in aerospace structures, over the past forty years. Their high strength-to-weight and stiffness-to-weight ratios are the main material characteristics that attract the attention of the structural and design engineers. Advanced Mechanics of Composite Materials and Structural Elements helps ensure that researchers and engineers can continue to innovate in this vital field. Detailed physical and mathematical coverage of complex mechanics and analysis required in actual applications - not just standard homogeneous isotropic materials Environmental and manufacturing discussions enable practical implementation within manufacturing technology, experimental results, and design specifications. Discusses material behavior impacts in-depth such as nonlinear elasticity, plasticity, creep, structural nonlinearity enabling research and application of the special problems of material micro- and macro-mechanics.

Composite Structures According to Eurocode 4 - Darko Dujmovic 2015-04-20

The use of composite
structures in construction is increasing. The optimized combination of the two materials concrete and steel produces particularly cost-efficient structures. This book presents a large number of numerical examples with detailed explanations of the provisions of Eurocode 4. It deals with the most common structural components in building construction: beams, columns and slabs. Furthermore, comprehensive chapters provide insight into the topics of creep and shrinkage, as well as fatigue. This book enables the reader to efficiently perform analyses of composite structures. It is a valuable reference book for professionals as well as an outstanding means for students to become familiar with the Eurocode 4.

Design of Composite Beams with Large Web Openings-R. M. Lawson 2011

Structural Analysis of Composite Wind Turbine Blades-Dimitris I Chortis 2013-06-29 This book concerns the development of novel finite elements for the structural analysis of composite beams and blades. The introduction of material damping is also an important aspect of composite structures and it is presented here in terms of their static and dynamic behavior. The book thoroughly presents a new shear beam finite element, which entails new blade section mechanics, capable of predicting structural blade coupling due to composite coupling and/or internal section geometry. Theoretical background is further expanded towards the inclusion of nonlinear structural blade models and damping mechanics for composite structures. The models effectively include geometrically nonlinear terms due to large displacements and rotations, improve the modeling accuracy of very large flexible blades, and enable the modeling of rotational stiffening and buckling, as well as, nonlinear structural coupling. Validation simulations on specimen level study the geometric nonlinearities effect on the modal frequencies and damping values of composite strips of various angle-ply laminations under either tensile or buckling loading. A series of correlation cases between numerical predictions and experimental measurements give credence to the developed nonlinear beam finite
element models and underline the essential role of new nonlinear damping and stiffness terms. Vibration and Buckling Analyses of Tapered Composite Beams Using Conventional and Advanced Finite Element Formulations-Abolghassem Zabihollah 2003
Proceedings of the International Conference on Advances in Computational Mechanics 2017-Hung Nguyen-Xuan 2018-02-20 This book provides an overview of state-of-the-art methods in computational engineering for modeling and simulation. This proceedings volume includes a selection of refereed papers presented at the International Conference on Advances in Computational Mechanics (ACOME) 2017, which took place on Phu Quoc Island, Vietnam on August 2-4, 2017. The contributions highlight recent advances in and innovative applications of computational mechanics. Subjects covered include: biological systems; damage, fracture and failure; flow problems; multiscale multiphysics problems; composites and hybrid structures; optimization and inverse problems; lightweight structures; computational mechatronics; computational dynamics; numerical methods; and high-performance computing. The book is intended for academics, including graduate students and experienced researchers interested in state-of-the-art computational methods for solving challenging problems in engineering. Applied Mechanics Reviews- 1990
Beam Structures-Erasmo Carrera 2011-07-28 Beam theories are exploited worldwide to analyze civil, mechanical, automotive, and aerospace structures. Many beam approaches have been proposed during the last centuries by eminent scientists such as Euler, Bernoulli, Navier, Timoshenko, Vlasov, etc. Most of these models are problem dependent: they provide reliable results for a given problem, for instance a given section and cannot be applied to a different one. Beam Structures: Classical and Advanced Theories proposes a new original unified approach to beam theory that includes practically all classical and advanced models for beams and which has become established and recognised globally as the most important contribution to the field in the last quarter of a
The Carrera Unified Formulation (CUF) has hierarchical properties, that is, the error can be reduced by increasing the number of the unknown variables. This formulation is extremely suitable for computer implementations and can deal with most typical engineering challenges. It overcomes the problem of classical formulae that require different formulas for tension, bending, shear and torsion; it can be applied to any beam geometries and loading conditions, reaching a high level of accuracy with low computational cost, and can tackle problems that in most cases are solved by employing plate/shell and 3D formulations. Key features: compares classical and modern approaches to beam theory, including classical well-known results related to Euler-Bernoulli and Timoshenko beam theories pays particular attention to typical applications related to bridge structures, aircraft wings, helicopters and propeller blades provides a number of numerical examples including typical Aerospace and Civil Engineering problems proposes many benchmark assessments to help the reader implement the CUF if they wish to do so accompanied by a companion website hosting dedicated software MUL2 that is used to obtain the numerical solutions in the book, allowing the reader to reproduce the examples given in the book as well as to solve other problems of their own www.mul2.com Researchers of continuum mechanics of solids and structures and structural analysts in industry will find this book extremely insightful. It will also be of great interest to graduate and postgraduate students of mechanical, civil and aerospace engineering.

Analysis of Structures on Elastic Foundations-
Edward Tsudik 2012-07 Analysis of Structures on Elastic Foundations is a practical guide for structural and geotechnical engineers as well as graduate students working in foundation engineering. Included are detailed descriptions of practical methods of analysis of various foundations including simple beams on elastic foundations as well as very complex foundations such as mat foundations supported on piles. Methods for fast and easy hand analysis in addition to methods for exact computer analysis are presented. Most of the methods are
developed for three soil models: Winkler foundation, elastic half-spaces, and elastic layers. Numerous numerical examples illustrate the applications of these methods.

Composite Structures Of Steel And Concrete-R. P. Johnson 1995-11-22 This book sets out the basic principles of composite construction with reference to beams, slabs, columns and frames, and their applications to building structures. It deals with the problems likely to arise in the design of composite members in buildings, and relates basic theory to the design approach of Eurocodes 2, 3 and 4. The new edition is based for the first time on the finalised Eurocode for steel/concrete composite structures.

Coupled Electromechanical Response of Composite Beams with Embedded Piezoelectric Sensors and Actuators- 1994

Analytical Methods in Anisotropic Elasticity-Omri Rand 2007-12-25 * Comprehensive textbook/reference applies mathematical methods and modern symbolic computational tools to anisotropic elasticity * Presents unified approach to a vast diversity of structural models

* State-of-the-art solutions are provided for a wide range of composite material configurations, including: 3-D anisotropic bodies, 2-D anisotropic plates, laminated and thin-walled structures

Steel & Composite Structures-Brian Uy 2010 Statics and Rotational Dynamics of Composite Beams-Mehrdad Ghorashi 2016-02-06 This book presents a comprehensive study of the nonlinear statics and dynamics of composite beams and consists of solutions with and without active elements embedded in the beams. The static solution provides the initial conditions for the dynamic analysis. The dynamic problems considered include the analyses of clamped (hingeless) and articulated (hinged) accelerating rotating beams. Two independent numerical solutions for the steady state and the transient responses are presented. The author illustrates that the transient solution of the nonlinear formulation of accelerating rotating beam converges to the steady state solution obtained by the shooting method. Other key areas considered include calculation of the effect of perturbing the steady state solution, coupled
nonlinear flap-lag dynamics of a rotating articulated beam with hinge offset and aerodynamic damping, and static and dynamic responses of nonlinear composite beams with embedded anisotropic piezo-composite actuators. The book is intended as a thorough study of nonlinear elasticity of slender beams and is targeted to researchers, graduate students, and practicing engineers in the fields of structural dynamics, aerospace structures, and mechanical engineering.


Mechanics of Composite Structures-László P. Kollár 2003-02-17 An increase in the use of composite materials in areas of engineering has led to a greater demand for engineers versed in the design of structures made from such materials. This book offers students and engineers tools for designing practical composite structures. Among the topics of interest to the designer are stress-strain relationships for a wide range of anisotropic materials; bending, buckling, and vibration of plates; bending, torsion, buckling, and vibration of solid as well as thin walled beams; shells; hygrothermal stresses and strains; finite element formulation; and failure criteria. More than 300 illustrations, 50 fully worked problems, and material properties data sets are included. Some knowledge of composites, differential equations, and matrix algebra is helpful but not necessary, as the book is self-contained. Graduate students, researchers, and practitioners will value it for both theory and application.

Optimum Composite Structures-Karam Maalawi 2019-01-30 The subject of optimum composite structures is a rapidly evolving field and intensive research and development have taken place in the last few decades. Therefore, this book aims to provide an up-to-date comprehensive overview of the current status in this field to the research community. The contributing authors combine structural analysis, design and optimization basis of composites with a description of the implemented mathematical
approaches. Within this framework, each author has dealt with the individual subject as he/she thought appropriate. Each chapter offers detailed information on the related subject of its research with the main objectives of the works carried out as well as providing a comprehensive list of references that should provide a rich platform of research to the field of optimum composite structures.

Stress Analysis of Fiber-reinforced Composite Materials-M. W. Hyer 2009-01-01 Updated and improved, Stress Analysis of Fiber-Reinforced Composite Materials, Hyer's work remains the definitive introduction to the use of mechanics to understand stresses in composites caused by deformations, loading, and temperature changes. In contrast to a materials science approach, Hyer emphasizes the micromechanics of stress and deformation for composite material analysis. The book provides invaluable analytic tools for students and engineers seeking to understand composite properties and failure limits. A key feature is a series of analytic problems continuing throughout the text, starting from relatively simple problems, which are built up step-by-step with accompanying calculations. The problem series uses the same material properties, so the impact of the elastic and thermal expansion properties for a single-layer of FR material on the stress, strains, elastic properties, thermal expansion and failure stress of cross-ply and angle-ply symmetric and unsymmetric laminates can be evaluated. The book shows how thermally induced stresses and strains due to curing, add to or subtract from those due to applied loads. Another important element, and one unique to this book, is an emphasis on the difference between specifying the applied loads, i.e., force and moment results, often the case in practice, versus specifying strains and curvatures and determining the subsequent stresses and force and moment results. This represents a fundamental distinction in solid mechanics.

Load Bearing Behaviour of Composite Beams in Low Degrees of Partial Shear Connection-Roland Bärtschi 2005

Steel & Composite Structures-Brian Uy 2010

Analysis of Composite Structures-Christian Decolon 2002 This book provides the basis for calculations of composite structures, using continuum mechanics to facilitate the treatment of more elaborate theories. A composite structure combines traditional materials (such as concrete) with new materials (such as high performance fibres) to explore and develop new structures. The author deals with individual layers in laminate composites, discussing the basic laws that govern mixtures. Recommended for both student and professional use. A systematic, compact presentation in a single volume. Covers the governing equations of composite beams, plates and structures.

Composite Construction in Steel and Concrete IV-Jerome F. Hajjar 2002-01-01

Finite Element Analysis of Composite Materials Using ANSYS-Ever J. Barbero 2013-12-11

Designing structures using composite materials poses unique challenges, especially due to the need for concurrent design of both material and structure. Students are faced with two options: textbooks that teach the theory of advanced mechanics of composites, but lack computational examples of advanced analysis, and books on finite element analysis.

Elementary Behaviour of Composite Steel and Concrete Structural Members-Deric J. Oehlers 1999-09-01 This book is aimed at developing the elementary analysis skills, familiarity and intuitive feel for composite construction that is required by undergraduate and graduate students, and by structural engineers. It does not require a prior knowledge of advanced analysis and design techniques, but builds on simple concepts such as statics and the mechanics of materials. A topic is first introduced by a brief description, with numerous carefully-chosen...
examples forming an integral part of the main text. Working through the examples allows the reader to gain a full understanding of the subject, as a technique is illustrated by its application to the design of new structures, or the important area of assessing and upgrading existing structures. The techniques described for the analysis of standard structures form a basis for understanding the way composite structures work, and these techniques are applied to many non-standard forms of composite construction that are rarely covered in national standards, if at all. The book is an essential purchase for all undergraduate and postgraduate students of structural and civil engineering, as well as all practitioners. Structural Analysis of Polymeric Composite Materials, Second Edition-Mark E. Tuttle 2012-12-03 Structural Analysis of Polymeric Composite Materials, Second Edition introduces the mechanics of composite materials and structures and combines classical lamination theory with macromechanical failure principles for prediction and optimization of composite structural performance. It addresses topics such as high-strength fibers, manufacturing techniques, commercially available compounds, and the behavior of anisotropic, orthotropic, and transversely isotropic materials and structures subjected to complex loading. Emphasizing the macromechanical (structural) level over micromechanical issues and analyses, this unique book integrates effects of environment at the outset to establish a coherent and updated knowledge base. In addition, each chapter includes example problems to illustrate the concepts presented. Advances in Structural Engineering-Vasant Matsagar 2014-12-12 The book presents research papers presented by academicians, researchers, and practicing structural engineers from India and abroad in the recently held Structural Engineering Convention (SEC) 2014 at Indian Institute of Technology Delhi during 22 - 24 December 2014. The book is divided into three volumes and encompasses multidisciplinary areas within structural engineering, such as earthquake engineering and structural dynamics,
structural mechanics, finite element methods, structural vibration control, advanced cementitious and composite materials, bridge engineering, and soil-structure interaction. Advances in Structural Engineering is a useful reference material for structural engineering fraternity including undergraduate and postgraduate students, academicians, researchers and practicing engineers. Research and Applications in Structural Engineering, Mechanics and Computation contains the Proceedings of the Fifth International Conference on Structural Engineering, Mechanics and Computation (SEMC 2013, Cape Town, South Africa, 2-4 September 2013). Over 420 papers are featured. Many topics are covered, but the contributions may be seen to fall