Analysis And Performance Of Fiber Composites Agarwal

This new book facilitates the study of problematic chemicals in such applications as chemical fate modeling, chemical process design, and experimental design. It provides a valuable overview of current chemical processes, products, and practices and analyzes theories to formulate and prove physicochemical principles. It addresses the production and application of polymers, including chemical, physicochemical, and purely physical methods of examination. Topics include: • Radiotransparent fiberglass plastic products based on highly cross-linked polymer matrices • Properties and development of hyaluronan (HA) for pharmaceutical applications • Adhesive bonding of steel sheets treated by nitrooxidation in comparison with nontreated steel • Results of simulation by the Monte Carlo method of kinetics of three-dimensional free-radical polymerization of tetrafunctional monomers (TFM) • Elastomeric compositions based on systems with functionally active components for extreme conditions • Experimental research on efficient clearing of gas emissions in the manufacture of ceramic materials • The use of solar cells in the manufacture of textile materials • Ceramization of polymer compositions as a method for flame retardancy in materials The important research found in this book will aid scientists and researchers in developing improved engineering materials. The book’s coverage of a broad spectrum of key developments can be applied in industrial chemistry, biochemistry, and materials science.

This report describes laboratory and field experiments conducted using discrete synthetic fibers to stabilize sands for expedient road construction. Unconfined compression tests were conducted as an index of material performance to identify the effects of fiber type, length, content, denier, and sand type on load-bearing capacity. Field sections consisting of 8-in. fiber-stabilized layers over a sand subgrade (SP) were constructed and trafficked to validate the laboratory results under actual field conditions. Experiment items were trafficked with 10,000 passes of a 41,600-lb 5-ton military truck. Test results showed that fiber-reinforced sand materials are capable of providing structural support to military traffic over sand subgrades. The results revealed optimum stabilization parameters, practical construction technique, and effective maintenance procedures. Design, construction, and maintenance guidance are provided for using fiber-reinforced materials to support substantial amounts of military traffic.

Updated and expanded coverage of the latest trends and developments in fiber composite materials, processes, and applications Analysis and Performance of Fiber Composites, Fourth Edition features updated and expanded coverage of all technical aspects of fiber composites, including the latest trends and developments in materials, manufacturing processes, and materials applications, as well as the latest experimental characterization methods. Fiber reinforced composite materials have become a fundamental part of modern product manufacturing. Routinely used in such high-tech fields as electronics, automobiles, aircraft, and space vehicles, they are also essential to everyday staples of modern life, such as containers, piping, and appliances. Little wonder, when one considers their ease of fabrication, outstanding mechanical properties, design versatility, light weight, corrosion and impact resistance, and excellent fatigue strength. This Fourth Edition of the classic reference—the standard text for composite materials courses, worldwide—offers an unrivalled review of such an important class of engineering materials. Still the most comprehensive, up-to-date treatment of the mechanics, materials, performance, analysis, fabrication, and characterization of fiber composite materials available, Analysis and Performance of Fiber Composites, Fourth Edition features: Expanded coverage of materials and manufacturing, with additional information on materials, processes, and material applications Updated and expanded information on experimental characterization methods—including many industry specific tests Discussions of damage identification techniques using nondestructive evaluation (NDE) Coverage of the influence of moisture on performance of polymer matrix composites, stress corrosion of glass fibers and glass reinforced plastics, and damage due to low-velocity impact New end-of-chapter problems and exercises with solutions found on an accompanying website Computer analysis of laminates No other reference provides such exhaustive coverage of fiber composites with such clarity and depth. Analysis and Performance of Fiber Composites, Fourth Edition is, without a doubt, an indispensable resource for practicing engineers, as well as students of mechanics, mechanical engineering, and aerospace engineering.

This conference proceedings brings together the work of researchers and practising engineers concerned with computational modelling of complex concrete, reinforced concrete and prestressed concrete structures in engineering practice. The subjects considered include computational mechanics of concrete and other cementitious materials, including masonry. Advanced discretisation methods and microstructural aspects within multi-field and multi-scale settings are discussed, as well as modelling formulations and constitutive modelling frameworks and novel experimental programmes. The conference also considered the need for reliable, high-quality analysis and design of concrete structures in regard to safety-critical structures, with a view to adopting these in codes of practice or recommendations. The book is of special interest to researchers in computational mechanics, and industry experts in complex nonlinear simulations of concrete structures.

This book is intended to be an introductory text for engineers and physicists who are likely to be involved in the area of optical fiber communications. Its purpose is to provide the student with an explanatory text that can al so be used for "self-study". Thus, key theoretical resul ts have been rather thoroughly derived, and detailed explanations have been given wherever cer tain steps have been excluded. Some of the derivations are in new form, which the reader will hopefully find stimulating. In addition, some of the ex perimental and theoretical results are based on the research of the authors, and they are published here for the first time. However, references are given for all those cases involving equivalent results obtained by others. Although a large number of monographs are available for the specialist or the knowledgeable scientist, most of these are inadequate for teaching pur poses. This aspect served as a major motivation for writing a book that ex plains the basic phenomena and techniques. The required material was partly developed in earlier courses

on integrated optics and optical fiber commu nications, and partly resulted from the authors' close cooperation with in dustry. To assess the suitability of the material, the manuscript of the book was used with encouraging results for a graduate course (spring sem ester, 1980) at the Communications Laboratory of the Helsinki University of Technology.
Principles of Composite Material Mechanics, Third Edition presents a unique blend of classical and contemporary mechanics of composites technologies. While continuing to cover classical methods, this edition also includes frequent references to current state-of-the-art composites technology and research findings. New to the Third Edition Many new worked-out example problems, homework problems, figures, and references An appendix on matrix concepts and operations Coverage of particle composites, nanocomposites, nanoenhancement of conventional fiber composites, and hybrid multiscale composites Expanded coverage of finite element modeling and test methods Easily accessible to students, this popular bestseller incorporates the most worked-out example problems and exercises of any available textbook on mechanics of composite materials. It offers a rich, comprehensive, and up-to-date foundation for students to begin their work in composite materials science and engineering. A solutions manual and PowerPoint presentations are available for qualifying instructors.
This book provides a simple and unified approach to the mechanics of discontinuous-fibre reinforced composites, and introduces readers as generally as possible to the key concepts regarding the mechanics of elastic stress transfer, intermediate modes of stress transfer, plastic stress transfer, fibre pull-out, fibre fragmentation and matrix rupture. These concepts are subsequently applied to progressive stages of the loading process, through to the composite fractures. The book offers a valuable guide for advanced undergraduate and graduate students attending lecture courses on fibre composites. It is also intended for beginning researchers who wish to develop deeper insights into how discontinuous fibre provides reinforcement to composites, and for engineers, particularly those who wish to apply the concepts presented here to design and develop discontinuous-fibre reinforced composites.
This collection of 33 papers deals with mechanical behaviors associated with systems ranging from diamond reinforced silicon carbide to rare earth pyrosilicates. Presented at The Mechanical Behavior and Performance of Ceramics & Composites Symposium in January 2012 during the 36th International Conference on Advanced Ceramics and Composites (ICACC), it offers researchers from around the world the opportunity to explore new and emerging issues in all aspects of the field.
First published in 1991. CRC Press is an imprint of Taylor & Francis.
Natural Fiber Reinforced Vinyl Ester and Vinyl Polymer Composites: Characterization, Properties and Applications discusses recent advances on the development, characterization and application of natural fiber vinyl ester and vinyl polymers composites. Various types of vinyl ester and vinyl based polymers, such as poly(vinyl chloride) (PVC), low and high density polyethylene (LDPE and HDPE), polypropylene (PP), polyvinyl alcohol (PVA) and polyvinyl acetate (PVAc) are discussed. Chapters focus on different composite fabrication processes, such as compression moulding, hand lay-up, and pultrusion processes. Key themes covered include the properties and characterization of vinyl ester and vinyl polymers composites reinforced by natural fibers. The effect of fiber treatment and coupling agents on mechanical and physical properties of these materials is also evaluated. In addition to a determination of physical and mechanical properties, studies on thermal, degradation, swelling behavior, and the morphological properties of natural fiber reinforced vinyl ester and vinyl polymer composites is also presented. Presents the importance of vinyl ester and vinyl-based polymers as matrices in natural fiber composites Provides a detailed and comprehensive review on the development, characterization and applications of natural fiber vinyl ester and vinyl polymers composites Looks at recent fabrication techniques and the mechanical properties of materials Contains contributions from leading experts in the field
Fiber Technology for Fiber-Reinforced Composites provides a detailed introduction to fiber reinforced composites, explaining the mechanics of fiber reinforced composites, along with information on the various fiber types, including manufacturing of fibers (starting from monomers and precursors), fiber spinning techniques, testing of fibers, and surface modification of fibers. As material technologies develop, composite materials are becoming more and more important in transportation, construction, electronics, sporting goods, the defense industry, and other areas of research. Many engineers working in industry and academics at universities are trying to manufacture composite materials using a limited number of fiber types with almost no information on fiber technology, fiber morphology, fiber properties, and fiber sizing agents. This book fills that gap in knowledge. Unique in that it focuses on a broad range of different fiber types used in composites manufacturing Contains contributions from leading experts working in both industry and academia Provides comprehensive coverage on both natural and nanofibers
Microsoft Windows 8.1 and Windows Server 2012 R2 are designed to be the best performing operating systems to date, but even the best systems can be overwhelmed with load and/or plagued with poorly performing code. Windows Performance Analysis Field Guide gives you a practical field guide approach to performance monitoring and analysis from experts who do this work every day. Think of this book as your own guide to "What would Microsoft support do?" when you have a Windows performance issue. Author Clint Huffman, a Microsoft veteran of over fifteen years, shows you how to identify and alleviate problems with the computer resources of disk, memory, processor, and network. You will learn to use performance counters as the initial indicators, then use various tools to "dig in" to the problem, as well as how to capture and analyze boot performance problems. This field guide gives you the tools and answers you need to improve Microsoft Windows performance, including: Save money on optimizing Windows performance with deep technical troubleshooting that tells you "What would Microsoft do to solve this?" Includes performance counter templates so you can collect the right data the first time. Learn how to solve performance problems using free tools from Microsoft such as the Windows Sysinternals tools and more. In a rush? Chapter 1 Start Here gets you on the quick path to solving the problem. Also covers earlier versions such as Windows 7 and Windows Server 2008 R2.
Updated and expanded coverage of the latest trends and developments in fiber composite materials, processes, and applications Analysis and Performance of Fiber Composites, Fourth Edition features updated and expanded coverage of all technical aspects of fiber composites, including the latest trends and developments in materials, manufacturing processes, and materials applications, as well as the latest experimental characterization methods. Fiber reinforced composite materials have become a fundamental part of modern product manufacturing. Routinely used in such high-tech fields as electronics, automobiles, aircraft, and space vehicles, they are also essential to everyday staples of modern life, such as containers, piping, and appliances. Little wonder, when one considers their ease of fabrication, outstanding mechanical properties, design versatility, light weight, corrosion

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This comprehensive single volume handbook covers every aspect of reinforcement science, from hands-on subjects, such as manual 'lay-up' processing, to theoretical discussions concerning rheology and modeling. Taken from the recently published six volume International Encyclopedia of Composites, this reference volume offers scholarly and practical knowledge of distinguished industry-experts, academics, and government researchers in one accessible and informative handbook. Fibers, processes, and composite reinforcement types, as well as relevant miscellaneous subjects such as property relationships, manufacturing, hybrid reinforcements, and modeling are given detailed treatment. Engineers, materials scientists, and technologists will find the Composite Reinforcement Handbook an invaluable tool.

The book includes the best articles presented by researchers, academicians and industrial experts at the International Conference on “Innovative Design and Development Practices in Aerospace and Automotive Engineering (I-DAD 2018)”. The book discusses new concept in designs, and analysis and manufacturing technologies for improved performance through specific and/or multi-functional design aspects to optimise the system size, weight-to-strength ratio, fuel efficiency and operational capability. Other aspects of the conference address the ways and means of numerical analysis, simulation and additive manufacturing to accelerate the product development cycles.Describing innovative methods, the book provides valuable reference material for educational and research organizations, as well as industry, wanting to undertake challenging projects of design engineering and product development.

CREEP, SHRINKAGE AND DURABILITY MECHANICS OF CONCRETE AND CONCRETE STRUCTURES contains the keynote lectures, technical reports and contributed papers presented at the Eighth International Conference on Creep, Shrinkage and Durability of Concrete and Concrete Structures (CONCREEP8, Ise-shima, Japan, 30 September - 2 October 2008). The topics covered

The book Optical Fiber and Wireless Communications provides a platform for practicing researchers, academics, PhD students, and other scientists to review, plan, design, analyze, evaluate, intend, process, and implement diversiform issues of optical fiber and wireless systems and networks, optical technology components, optical signal processing, and security. The 17 chapters of the book demonstrate capabilities and potentialities of optical communication to solve scientific and engineering problems with varied degrees of complexity.

This study aims to evaluate the impact of fiber types on the performance of hot mix asphalt (HMA) mixtures. Specifically, the impacts of fiber type on HMA mix design and laboratory performance are investigated. Four types of fiber (fiberglass, basalt, carbon, and polyolefin/aramid blend) were used to produce four fiber-reinforced HMA mixes, and a control mix without fibers was also prepared. The fiber dosage rates used in this study were 0.16% (fiberglass, basalt, and carbon) and 0.05% (polyolefin/aramid) by total mixture weight, based on manufacturer recommendations. Two mixing procedures for introducing fibers into HMA were also evaluated: dry and 15-s dispersion methods. The dry method involved mixing the fibers with aggregates before the addition of asphalt binder while the 15-s dispersion method involved adding the fibers into the mix every 15 seconds (as aggregates were coated by asphalt binder during the mixing process). All the HMA mixtures (unreinforced and fiber-reinforced) were then subjected to several different laboratory performance tests: dynamic complex modulus, Cantabro durability, asphalt pavement analyzer, flow number, and indirect tensile strength. Analysis of variance was conducted to evaluate statistically the impact of fibers on mix performance. Results showed that fibers affected the volumetric properties, mix durability, and rutting resistance of HMA mixes. It was also found that the process for introducing fibers into the mix (i.e., mixing method) affected the consistency of fiber-reinforced HMA samples. Overall, the results of this study showed that the use of fibers improved the rutting and durability performance of asphalt mixtures in the laboratory.

The study and application of composite materials are a truly interdisciplinary endeavour that has been enriched by contributions from chemistry, physics, materials science, mechanics and manufacturing engineering. The understanding of the interface (or interphase) in composites is the central point of this interdisciplinary effort. From the early development of composite materials of various nature, the optimization of the interface has been of major importance. While there are many reference books available on composite materials, few of them deal specifically with the science and mechanics of the interface of fiber reinforced composites. Further, many recent advances devoted solely to research in composite interfaces have been scattered in a variety of published literature and have yet to be assembled in a readily accessible form. To this end this book is an attempt to bring together recent developments in the field, both from the materials science and mechanics perspective, in a single convenient volume. The central theme of the book is tailoring the interface properties to optimise the mechanical peformance and structural integrity of composites with enhanced strength/stiffness and fracture toughness (or specific fracture resistance). It deals mainly with interfaces in advanced composites made from high performance fibers, such as glass, carbon, aramid, ultra high modulus polyethylene and some inorganic (e.g. B/W, A12O3, SiC) fibers, and matrix materials encompassing polymers, metals/alloys and ceramics. The book is intended to provide a comprehensive treatment of composite interfaces in such a way that it should be of interest to materials scientists, technologists and practising engineers, as well as graduate students and their supervisors in advanced composites. We hope that this book will also serve as a valuable source of reference to all those involved in the design and research of composite interfaces. The book contains eight chapters of discussions on microstructure-property relationships with underlying fundamental mechanics principles. In Chapter 1, an introduction is given to the nature and definition of interfaces in

fiber reinforced composites. Chapter 2 is devoted to the mechanisms of adhesion which are specific to each fiber-matrix system, and the physio-chemical characterization of the interface with regard to the origin of adhesion. The experimental techniques that have been developed to assess the fiber-matrix interface bond quality on a microscopic scale are presented in Chapter 3, along with the techniques of measuring interlaminar/intralaminar strengths and fracture toughness using bulk composite laminates. The applicability and limitations associated with loading geometry and interpretation of test data are compared. Chapter 4 presents comprehensive theoretical analyses based on shear-lag models of the single fiber composite tests, with particular interest being placed on the interface debond process and the nature of the fiber-matrix interfacial bonding. Chapter 5 is devoted to reviewing current techniques of fiber surface treatments which have been devised to improve the bond strength and the fiber-matrix compatibility/stability during the manufacturing processes of composites. The micro-failure mechanisms and their associated theories of fracture toughness of composites are discussed in Chapter 6. The roles of the interface and its effects on the mechanical performance of fiber composites are addressed from several viewpoints. Recent research efforts to augment the transverse and interlaminar fracture toughness by means of controlled interfaces are presented in Chapters 7 and 8.

This book focuses on optical fiber sensing and structural health monitoring technologies. It provides detailed information on the basic theory of F-P optical fiber sensors, fiber Bragg grating sensors, fiber laser grating sensors and fully distributed optical fiber sensors. Drawing on the authors' research achievements and many years of practical experience in the field of engineering structure health monitoring, the book elaborates on the structural principle, design and manufacture of optical fiber sensors and monitoring technologies, and briefly describes advances made with regard to multiple engineering structures.

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.

The leading international authorities bring together in this contributed volume the latest research and current thinking on advanced fiber reinforced cement composites. Under rigorous editorial control, 13 chapters map out the key properties and behaviour of these materials, which promise to extend their applications into many more areas in the com

This book addresses the issue of designing the microstructure of fiber composite materials in order to obtain optimum performance. Besides the systematic treatment of conventional continuous and discontinuous fiber composites, the book also presents the state-of-the-art of the development of textile structural composites as well as the nonlinear elastic finite deformation theory of flexible composites. The author's experience during twenty years of research and teaching on composite materials is reflected in the broad spectrum of topics covered, including laminated composites, statistical strength theories of continuous fiber composites, short fiber composites, hybrid composites, two- and three-dimensional textile structural composites and flexible composites. This book provides the first comprehensive analysis and modeling of the thermo-mechanical behavior of fiber composites with these distinct microstructures. Overall, the inter-relationships among the processing, microstructures and properties of these materials are emphasized throughout the book. The book is intended as a text for graduate or advanced undergraduate students, but will also be an excellent reference for all materials scientists and engineers who are researching or working with these materials.

The broad collection of techniques gathered in this book help illustrate material/process/property relationships for a wide selection of materials and processes in the plastics industry. With the recent increases in computing power and scope, as well as advances in software engineering, imaging has already become a universal tool. Image processing and image analysis have become common expressions are widely recognized within the scientific community. The imaging techniques employed range from visible optical methods to scanning and transmission electron microscopy, x-ray, thermal wave infrared and atomic force microscopy. Image analysis is used to monitor/ characterize a variety of processes. Processes included within this book are: extrusion, injection molding, foam production, film manufacture, compression molding, blow molding, vulcanization, melt spinning, reactive blending, welding, conveying, composite manufacture, compounding, and thermosetting. Imaging techniques are also employed to characterize/quantify a number of important material properties. These include: fiber orientation distribution, homogeneity of mixing, the rate of spherulites growth, polymer crystallization rate, melt flow index, pore size and shape in foam, cell density in foam, void content, particle analysis in polymer blends, morphology, interparticle distance, fiber diameter, fatigue crack, crazing, scratching, surface roughness, fiber-length distribution, nucleation, oil penetration, peel adhesion, chemical resistance, droplet-fiber transition, electrical conductivity, dispersion and impurity content.

The Ceramic Engineering and Science Proceeding has been published by The American Ceramic Society since 1980. This series contains a collection of papers dealing with issues in both traditional ceramics (i.e., glass, whitewares, refractories, and porcelain enamel) and advanced ceramics. Topics covered in the area of advanced ceramic include bioceramics, nanomaterials, composites, solid oxide fuel cells, mechanical properties and structural design, advanced ceramic coatings, ceramic armor, porous ceramics, and more.

Thermal Analysis of Textiles and Fibers offers systematic and comprehensive coverage of the subject, from the principles of fiber structure and established TA methods, to advanced TA techniques and their application to high-performance fibers and textiles. Thermal analysis is a convenient method for assessing fiber and fabric performance as monitored

under end-use relevant conditions. Expertise in this field requires knowledge of both TA methods and of fiber behavior, information that is brought together in this new volume. In recent years, thermal analysis has been applied to a variety of novel and high-performance fibers, such as Kevlar, Vectran, PBI, polyolefins, polypropylene, PAN and PVA, amongst others. TA techniques are also used in fiber identification, characterization and stability testing and may be combined with spectroscopic techniques to yield still more information about fiber properties. Includes chapters on novel and high-performance fibers that are used in assembling technical textiles Covers advanced TA methods, such as combined and modulated techniques Brings together focused information on TA for fibers and textiles that is not otherwise available in a single volume

This book presents a unified approach to fracture behavior of natural and synthetic fiber-reinforced polymer composites on the basis of fiber orientation, the addition of fillers, characterization, properties and applications. In addition, the book contains an extensive survey of recent improvements in the research and development of fracture analysis of FRP composites that are used to make higher fracture toughness composites in various applications. The FRP composites are an emerging area in polymer science with many structural applications. The rise in materials failure by fracture has forced scientists and researchers to develop new higher strength materials for obtaining higher fracture toughness. Therefore, further knowledge and insight into the different modes of fracture behavior of FRP composites are critical to expanding the range of their application.

This book is a collection of works dealing with the important technologies and mathematical concepts behind today's optical fiber communications and devices. It features 17 selected topics such as architecture and topologies of optical networks, secure optical communication, PONs, LANs, and WANs and thus provides an overall view of current research trends and technology on these topics. The book compiles worldwide contributions from many prominent universities and research centers, bringing together leading academics and scientists in the field of photonics and optical communications. This compendium is an invaluable reference edited by three scientists with a wide knowledge of the field and the community. Researchers and practitioners working in photonics and optical communications will find this book a valuable resource.

Analysis and Performance of Fiber CompositesJohn Wiley & Sons

Fatigue has long been recognized as a mechanism that can provoke catastrophic material failure in structural applications and researchers are now turning to the development of prediction tools in order to reduce the cost of determining design criteria for any new material. Fatigue of Fiber-reinforced Composites explains these highly scientific subjects in a simple yet thorough way. Fatigue behavior of fiber-reinforced composite materials and structural components is described through the presentation of numerous experimental results. Many examples help the reader to visualize the failure modes of laminated composite materials and structural adhesively bonded joints. Theoretical models, based on these experimental data, are demonstrated and their capacity for fatigue life modeling and prediction is thoroughly assessed. Fatigue of Fiber-reinforced Composites gives the reader the opportunity to learn about methods for modeling the fatigue behavior of fiber-reinforced composites, about statistical analysis of experimental data, and about theories for life prediction under loading patterns that produce multiaxial fatigue stress states. The authors combine these theories to establish a complete design process that is able to predict fatigue life of fiber-reinforced composites under multiaxial, variable amplitude stress states. A classic design methodology is presented for demonstration and theoretical predictions are compared to experimental data from typical material systems used in the wind turbine rotor blade industry. Fatigue of Fiber-reinforced Composites also presents novel computational methods for modeling fatigue behavior of composite materials, such as artificial neural networks and genetic programming, as a promising alternative to the conventional methods. It is an ideal source of information for researchers and graduate students in mechanical engineering, civil engineering and materials science.

This study aimed at evaluating the performance of BASF Synthetic and Steel fibers as alternative reinforcements in concrete pipes. A total of 93 synthetic fiber and 60 steel fiber reinforced pipes were produced and tested based on the ASTM C497 in order to have a benchmark for comparison with conventionally reinforced concrete pipes. Three production sites with different production equipment were used in different geographical locations in the United States. Standard ASTM C76 diameters of up to 36 in. with "Wall-B" and "Wall-C" were used in this study for both synthetic and steel fibers. Vertical and horizontal load-deformation plots for the majority of the pipes were obtained by instrumenting the test pipes with linear variable displacement transducer (LVDT). The load-deformation plots were recorded for up to 5% of the pipe diameter. The load-deformation plots for steel and synthetic fibers were compared with each other. During production, compressive cylinder and beam specimens from the same mix designs were produced and cured for ASTM C39 and ASTM C1609 tests, respectively. A total of 353 cylinders and 77 beams were produced and tested. The ASTM C1609 beam load deformation plots were compared for different fiber dosages and the area under this curve was calculated for each test specimen and modulus of toughness was calculated and documented. The patterns for material law (constitutive relationship) for low and high fiber dosages of both synthetic and steel fibers were identified. From the ASTM C39 and ASTM 1609 tests, a relationship between the tensile strength and square root of compressive strength was established on all the tests conducted. This study showed that the use of BASF synthetic and steel fibers in concrete pipes as alternative reinforcement is feasible. This study recommends the use of synthetic fibers with adequate dosage for up to 21 in. concrete pipes with "B-Walls," and up to 36 in. concrete pipes with "C-Walls." BASF (Maccafferri) steel fiber pipes are recommended as alternative reinforcement with adequate fiber dosage for up to 24 in. concrete pipes with "B-Wall" and up to 36 in. concrete pipes with "C-Walls." It should be noted that proper fiber dosage is a trial and error process based on local aggregate and cementitious materials and the type of production equipment used, which is also the case for the production of the conventionally reinforced concrete pipe.