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Book Reviews

Advanced Thermoset Composites: Industrial and Commercial Applications, Edited by J. M. Margolis Van Nostrand Reinhold Co., 1986, 282 pages Hard Cover $47.50

REVIEWED BY J. P. BELL[1]

The second part of the title of this book is important, since the book is intended largely for individuals who are interested in the design/fabrication of commercially available composite materials into parts. While the various available matrix and fiber systems are discussed in Chapter 1, the book is not a treatise on current materials research nor on mechanics/design calculations. After describing presently available fiber/matrix systems, a chapter on fabrication techniques with very useful photographs of equipment is given. A chapter on properties and performance requirements is an aid in selection of correct materials. Chapters on electrical and electronic, automotive, aircraft, process industry and building materials applications have been written by leaders in these fields. A final chapter titled "Opportunities for Design Engineers" indicates directions for the future.

Overall the book contains a wealth of practical data on commercial applications of composites. Many photographs and drawings of designs and design requirements are given throughout, by experts in the various application fields.

Adhesives Technology Handbook, by Arthur H. Landrock, Noyes Publications, Park Ridge, N.J. 07656; 1986, 444 pages, $64 Hard Cover

REVIEWED BY J. P. BELL

This book is intended for materials engineers, aerospace engineers, design engineers, formulation chemists, adhesives and sealants manufacturers, and technical sales personnel who are involved with the practical aspects of adhesion problems. Much of the material is on structural bonding, although some non-structural material is also included. The book contains thirteen chapters. After a general introduction to adhesion/bonding and definition of many terms given in the adhesive bonding literature, Chapter 3 discusses joint design and design criteria. Chapter 4 discusses practical surface preparation for a wide variety of materials, and chapter five describes the general types of adhesives in use, with properties and typical applications. Some fifty-seven adhesive types are discussed. Chapter 6 covers adhesives recommended for specific adherend types, and Chapter 7 discusses aspects of the overall bonding process such as adhesive storage, preparation application and joint assembly, weldbonding and bonding equipment. Chapter 8 covers solvent cementing, and Chapter 9 discusses aspects of durability in unfavorable environments. Chapters 10 and 11 cover quality control and general methods of testing. Chapter 12 is a unique chapter covering 235 published test methods and specifications used in the United States. Chapter 13 summarizes many important applications of adhesives in the automative, aircraft, space, electrical, electronic and building construction fields.

The book will be a useful reference work for the large number of individuals who work with practical aspects of adhesive bonding. For a more in-depth chemical approach to structural adhesives the reader might also be interested in Structural Adhesives, S. R. Hartshorn, Ed., Plenum Press 1986.

Production of High Strength Concrete, by M. B. Peterman and R. L. Carrasquillo, Noyes Publications, Park Ridge, New Jersey, 1986, pp. 278.

REVIEWED BY GREGORY C. FRANTZ[1]

The maximum available strength of ready-mix concrete has increased significantly in recent years with concrete with compressive strengths exceeding 11,000 psi at 28 days of age now being supplied in some parts of the United States. The production of high-strength concrete requires more attention to mix design and quality control than does production of low- and medium-strength concretes. This book explains how to produce concrete with compressive strengths above 9000 psi by discussing the interactions among the concrete components of cement, water, coarse and fine aggregates, and mineral and chemical admixtures, their proportions in the mix, and the contribution of each to producing high compressive strength. Effect of curing and specimen testing conditions on measured strength are also discussed. No exotic materials or production techniques are used to attain these high strengths. Although this work used cement, aggregate, and fly ash locally available in Texas, the general results and conclusions from the tests apply to the entire United States. This well referenced book will provide very valuable guidance to anyone who wants to develop economical, high-strength concrete mixes.

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286 The wider application of advanced composites in clean energy industries can support major DOE goals.Â 327 Thermoset resin based composites are difficult to recycle because the temperatures required to separate 328 the matrix material from the fiber can damage the fibers and leave residue that makes the fibers more 329 difficult to reprocess. In addition, the thermoset resin constituent material is typically broken down at the 330 elevated temperatures used to remove it from fibers. Important thermosetting resins in current commercial applications are the condensation products of formaldehyde with phenol (phenolic resins), urea or melamine (amino resins). Other major classes are epoxy resins, unsaturated polyester resins, allyl resins and isocyanate resins. [Pg.86]. The scientific classification of materials according to their flow behavior corresponds, in a limited sense, to the classification according to their commercial application.Â Advanced Thermoset Composites Industrial and Commercial Applications, Ed., J.M. Margolis, Van Nostrand Reinhold Co, New York, NY, USA, 1986. [Pg.151]. Dimer acid-based polyesters being used as thermoplasts, thermoset, and elastomers are used in large quantities as adhesives and coatings. Source: Composites Forecasts & Consulting LLC. Table 1: Comparison of Selected Aerospace Thermoset and Thermoplastic Resin Matrices. Source: Composites Forecasts & Consulting LLC. Fig. 2: Normalized Tensile Strength vs. Raw Material Price for Aerospace Thermoset and Thermoplastic Polymers. Source: Composites Forecasts & Consulting LLC. Table 2: Annual Fuel Burn Cost Reductions from Each Pound of Weight Savings. Composites as a separate class of engineering material have found many applications in aerospace industries where high performance and safety are a prime concern. A review has been done in order to provide a comprehensive analysis on various types of composites used in the aerospace industry, emphasizing on the features, properties, advantages, limitations, and emerging trends in the field.Â is easier and faster compared to thermosets. As the processing. of thermoplastics is reversible, they can be reshaped and.Â The data obtained for composites are compared with that for commercial grade polystyrene. The substantial variations of the nonlinear elastic moduli for composites with different types of fillers are demonstrated and analyzed.