Fibre Reinforced Materials. G. S. Holister and C. Thomas.

The technological community is universally thankful for authors who take the time and care to publish detailed assessments of the available literature. This applies especially to new and promising fields which are rising from a sound demonstrated beginning into importance. The composites of fibrous substances with elastic and plastic matrices qualify eminently for the treatment given in this work. There are those who believe that the field of composites stands on a springboard equivalent to the status of metal alloys at the beginning of this century.

Let it be agreed that with respect to reinforced organic macromolecules, asbestos and glass fibers dominate the commercial scene. The book treats the knowledge of principles underlying strengthening efforts that present and future research may apply to the utilization of metal wires, whiskers, glass, ceramic, or polymer fibers to strengthen any chosen matrix. Also important are powder metallurgy and the speculative research on strong two-phase structures wherein plates and rods are aligned in a ductile matrix by controlled solidification of alloys as in unidirectional eutectic solidification.

This book will intimidate the polymer chemist. The polymer engineer will be delighted. Basic concepts of fiber reinforcement have proliferated in this decade from sound beginnings before 1960. Thus, the work is valuable for its evaluation of the literature and segmentation of theories to facilitate comparisons and to equate the more theoretical explanations with experimental data.

The distinguishing element in this subject (in the realm of material strength studies) is, of course, the effect of fiber orientation and the interaction of the elastic fiber in the matrix. This is summarized after the fundamentals of longitudinal and transverse stress distribution are analyzed. In composite structures, the real world is forced to contend with many variables not existing in the homogeneous state. What complicates the analysis are such effects as the contact strengths or adhesion of reinforcement to the matrix, whether both are in an elastic or plastic condition or whether these are alternating. Additional considerations involve the effect of fiber volume, ductile versus brittle fibers, fiber length, and continuity.

Future experimentation will continue to supply evidence for the fulfillment of understanding. At this juncture, the debt is great to those who have supplied the model studies which]e the substance of this book.

The requirements of the space age as well as those of earthly comfort appear to dictate a demand for materials having high strength with low specific gravity. If the future confirms current exciting predictions for reinforcement, this work by its organization of thought will have justified the obviously great effort in assessing the present.

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