Applied Mechanics Solids Of Gbv

This special anniversary book celebrates the success of this Springer book series highlighting materials modeling as the key to developing new engineering products and applications. In this 100th volume of “Advanced Structured Materials”, international experts showcase the current state of the art and future trends in materials modeling, which is essential in order to fulfill the demanding requirements of next-generation engineering tasks.

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Although ceramics have been known to mankind literally for millennia, research has never ceased. Apart from the classic uses as a bulk material in pottery, construction, and decoration, the latter half of the twentieth century saw an explosive growth of application fields, such as electrical and thermal insulators, wear-resistant bearings, surface coatings, lightweight armour, or aerospace materials. In addition to plain, hard solids, modern ceramics come in many new guises such as fabrics, ultrathin films, microstructures and hybrid composites. Built on the solid foundations laid down by the 20-volume series Materials Science and Technology, Ceramics Science and Technology picks out this exciting material class and illuminates it from all sides. Materials scientists, engineers, chemists, biochemists, physicists and medical researchers alike will find this work a treasure trove for a wide range of ceramics knowledge from theory and fundamentals to practical approaches and problem solutions.

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This book commemorates the 80th birthday of Prof. W. Pietraszkiewicz, a prominent specialist in the field of general shell theory. Reflecting Prof. Pietraszkiewicz’s focus, the respective papers address a range of current problems in the theory of shells. In addition, they present other structural mechanics problems involving dimension-reduced models. Lastly, several applications are discussed, including material models for such dimension-reduced structures.

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Journal of Applied MechanicsOn the Time and Temperature Dependent Behaviour of Laminated Amorphous Polymers Subjected to Low-Velocity ImpactSpringer

The thesis investigates a polymeric laminate consisting of poly(methyl methacrylate) (PMMA) and thermoplastic polyurethane (TPU) experimentally and numerically with regard to its impact behaviour and applicability. After a basic characterization of the monolithic materials, PMMA-TPU-PMMA laminates were subjected to impact loadings at velocities up to 5 m/s using threepoint bending and dart impact tests. Based on the experimental basis, different material models for the Finite Element simulation are presented, which are able to capture the time and temperature dependent behaviour of the laminate. Final validation experiments, consisting of head-dummy impacts at 10 m/s on automotive side windows, were conducted for PMMA and the laminate in order to investigate their applicability as glass substitution products.

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