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   Sommario/riassunto This book provides readers with an elementary understanding of the
                      material behavior of structural silicones in façades. Based on extensive
                      experimental investigations on a transparent structural silicone
                      adhesive (TSSA), the material behavior, failure, and microscopic effects
                      such as stress whitening, cavitation failure, and the Mullins effect are
                      analyzed. In turn, novel hyperelastic material models are developed to
                      account for nonlinear material behavior under arbitrary deformations.
                      The development of a volumetric hyperelastic model makes it possible
                      for the first time to approximate the structural behavior of TSSA under
                      constrained tensile load and cavitation. The material models discussed
                      here were implemented in a finite element code for validation, and their
                      quality was confirmed by three-dimensional numerical simulations, in

which an additional stretch-based failure criterion was evaluated for failure prediction. The numerical studies are in good agreement with the experimental results.