

DYNAMIC COMPRESSIVE BEHAVIOR OF EPOXIDIZED SOYBEAN OIL/CLAY NANOCOMPOSITES

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High-rate compression experiments were conducted on epoxidized soybean oil (ESO)/clay nanocomposites with nanoclay weights of 0%, 5%, and 8%. A pulse-shaped split Hopkinson pressure bar (SHPB) was employed to conduct these high-rate experiments. The pulse shaping technique ensures nearly constant-strain-rate deformation under dynamically equilibrated stresses in specimens such that accurate stress-strain curves at various high rates were obtained. A MTS 810 hydraulically driven materials testing system was used to obtain low-rate, reference stress-strain curves. Strain-rate, nanoclay weight, and nanoclay distribution effects on the compressive properties of the nanocomposites were experimentally determined. A phenomenological strain-rate-dependent material model was used to describe the stress-strain response.