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Dynamic Characterization and Modeling of Potting Materials for Electronics Assemblies VASANT JOSHI, Naval Surface Warfare Center, Indian Head, MD 20640, GILBERT LEE, JAIME SANTIAGO, Naval Surface Warfare Center, Carderock Division, Bethesda, MD 20817 — Prediction of survivability of encapsulated electronic components subject to impact relies on accurate modeling. Both static and dynamic characterization of encapsulation material is needed to generate a robust material model. Current focus is on potting materials to mitigate high rate loading on impact. In this effort, encapsulation scheme consists of layers of polymeric material Sylgard 184 and Triggerbond Epoxy- 20-3001. Experiments conducted for characterization of materials include conventional tension and compression tests, Hopkinson bar, dynamic material analyzer (DMA) and a non-conventional accelerometer based resonance tests for obtaining high frequency data. For an ideal material, data can be fitted to Williams-Landel-Ferry (WLF) model. A new temperature-time shift (TTS) macro was written to compare idealized temperature shift factor (WLF model) with experimental incremental shift factors. Deviations can be observed by comparison of experimental data with the model fit to determine the actual material behavior. Similarly, another macro written for obtaining Ogden model parameter from Hopkinson Bar tests indicates deviations from experimental high strain rate data. In this paper, experimental results for different materials used for mitigating impact, and ways to combine data from resonance, DMA and Hopkinson bar together with modeling refinements will be presented.

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