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Scaling and characterization of steady waves in model Tungsten-Polymer Composites ROGER MINICH, DAVID BOBER, MUKUL KUMAR, Lawrence Livermore Natl Lab — A large number of velocity time histories have recently been measured for steady waves generated in a model tungsten loaded composite (*Bober et. al. Dynamic Behavior of Materials, Volume 1 pp 273-278 (2018)).* The volume fraction of tungsten loaded in the model composite ranged in value from 0.0 to 0.6 . A steady wave was observed for each volume fraction at four different aluminum impact velocities. Each velocity time history may be characterized by two distinct features: i.) the particle velocity of the transmitted wave front and ii.) the relaxation time to the asymptotic particle velocity for a given pressure. A phenomenology is developed involving transmission and reflection of trapped waves due to the strong impedance contrast between the tungsten particles and polymer matrix. A characteristic scale length, inversely proportional to the volume fraction, plays the analogous role to a high impedance layer in layered composites. The scaling captures the observed trends in the data. Finally, the scaling is related to the effective viscosity model for composite materials originated by L. Barker. This work was performed under auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. LLNL-ABS-769254

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