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Status of Statistical Modeling for Damage from Nucleation and Growth of Voids T.W. WRIGHT, US Army Research Laboratory, APG, MD 21005, K.T. RAMESH, The Johns Hopkins University, Baltimore, MD — Spall fracture is often dominated by rapid growth of voids. Recent research on void growth shows that nucleation may be represented as a continuum bifurcation, that the static critical tensile pressure may be calculated from standard constitutive data, and that growth rapidly becomes dominated by inertia. Sensitivity to imperfections arises from microstructural details, which is assumed to be represented by a statistical distribution of local critical stresses. This set of ideas, when coupled with a history of tensile pressure, is sufficient to generate the early history of porosity and the expected distribution of void sizes. One key result is that a higher rate of loading will nucleate voids at more potential sites, with higher pressure for a given porosity, and a more uniform distribution of smaller voids. Another prediction is that over a few decades of volumetric strain rate, the pressure at a fixed critical void volume fraction will vary as that strain rate raised to a power. This power law dependence corresponds well to spall data reported in the literature. The theory as developed so far (Molinari and Wright, 2005) will be reviewed and progress toward a physical model for void interaction and pressure release will be presented. A Molinari & TW Wright, A Physical Model for Nucleation and Early Growth of Voids in Ductile Materials under Dynamic Loading, in press, J. Mech. Phys. Solids, 2005

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