

# **DEMONSTRATION OF POWDER SHEAR DAMPING APPLIED TO PLATES**

S.W. PULITZER III, E.E. SWANSON, and H. HESHMAT

Mohawk Innovative Technology, Inc., 1037 Watervliet-Shaker Road, Albany, NY, 12205, USA

## **SUMMARY**

Thin powder films have been proposed as a damping medium to overcome the thermal and frequency limitations of viscoelastic materials. In previous work, a fundamental characterization of the stiffness and damping of constrained powder layers was conducted. To assess concept feasibility, constrained powder layers were integrated into a metal beam, and theoretical and experimental analyses showed that such layers are a viable damping mechanism. In this paper, the application of powder shear dampers to a plate will be presented. A novel method for fabricating a high temperature plate with constrained layer powder damping will be discussed, and the results of dynamic testing will be reviewed. A generic plate was designed and modeled using finite elements. Mode shapes and frequencies were identified analytically and correlated with experimental results. The theoretically optimal locations for damping on the plate were identified and treated with shear powder dampers.

Keywords: Powder, Shear, Damping, Vibration, Quasi-Hydrodynamic