

SIMULATION OF DUST-LADEN FLOWFIELDS

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Strong enhancements in dynamic pressure and associated drag loads on structures have been observed on past atmospheric nuclear tests over dusty surfaces. The effect has been attributed largely to the scouring and entrainment of surface dust behind the shock wave. This paper surveys the existing data base on dusty flows, with particular emphasis on recent simulation experiments which have served as the basis for calculational models. In particular, data from high explosive test series, Operation Mighty Mach, are presented which suggest that the flowfield associated with irregular Mach reflection, is particularly conducive for dust entrainment.

Both field and laboratory simulation concepts for investigating the physics governing blast-induced dust scouring and entrainment are describes for surface burst and height-of-burst flowfields. Potential optical and hydrodynamic diagnostic procedures for measuring key flowfield parameters are evaluated.