

DESIGN AND NUMERICAL SIMULATION OF SIMULTANEOUSLY DETONATED HEST AND DIHEST CHARGES - COMBINED EFFECTS

SAUER,F.M.;THOMSEN,J.M.;RINEHART,E.

In regions of high stress produced by the airblast from surface burst nuclear detonations, the airblast-induced momentum field combines with the momentum field produced by the direct coupled energy. For dry alluvium, the nearly vertical airblast induced momentum tends to dominate over the upward and outward motions associated with the direct-coupled energy. Furthermore, the airblast-induced stresses compact the alluvium so that the direct-induced stresses act along the unload-reload paths of the alluvium material model. The combined behavior is then dissimilar to what would have occurred if the stress fields were applied separately.

The paper describes an approach, using numerical simulation methods, to the design of a combined HEST/DIHEST ground motion simulator. The influence of the alluvium material model on the calculated motions is discussed. A specific example of a combined HEST/DIHEST design is presented along with the experimental results of a proof-of-concept test. Test results are compared with the design objective (the calculated nuclear ground motion) in terms of the translational, rotational and bending response of a simple structure.