

Modeling of Explosive Loading of Sand with a Coupled Euler-Lagrange Code

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Abstract

Computational modeling of explosively loaded saturated sand on a suspended plate is an inherently complex problem. In this study a computational method is used to predict the dynamic pressure load/impulse from a buried charge. A fully coupled code modeling the explosive charge, sand and air with a Eulerian mesh and the plate structure with Lagrange elements, such as Gemini-Dyna, is an appropriate computational tool. In water-saturated sand, the loadings are soil and water-transmitted shock and bubble or blast effects depending on the depth and the charge size. The computations provide the capability to determine the total impulse load placed on a horizontal plate on or above the soil due to an explosion in the saturated sand for different burial depths in saturated sand and different plate stand off distances. The following test case will be presented: (a) 4.5 Kg (10 lbs) TNT, 10.16 cm (4 in) depth of burial to top of charge, and 20.32 cm (8 inch) stand off distance (Test 4).