P80 A Simple Device for Testing Dynamic Mechanical Properties of Granular Materials

Eytan Kochavi, Avi Ravid, Shlomi Pistinner

Soreq Nuclear Research Center, Israel Atomic Energy Commission

Abstract:

A simple testing device was designed for the purpose of experimental and numerical investigation of soil protective properties. Two types of soil mixtures: gravel and dry sand were tested in this device. The device was numerically modeled using the commercial code Ls-Dyna. The constitutive model used for the sand consists of an equation of state and, a pressure dependent yield variant of the Drucker–Prager strength law. The experimental and computational results demonstrate that a key factor of the strength of soil is penetration of pressurized air into the soil mixture. When the soil is exposed to pressurized air, the testing devise fails. This results from soil fluidization due to air penetration into the soil. A soil composed of sand-gravel mixture prevents this exposure and, is more resistant to pressure loads. This resistance is maintained for limited time duration. However, this time duration is considerably longer than the duration applied by a blast load.

Notes: