

EVALUATION OF SHOCK MITIGATING CHARACTERISTICS OF ALLUVIAL SOIL

Dr DR Saroha and Rajesh Kumari

Terminal Ballistics Research Laboratory Chandigarh, 160030, India

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Abstract

Shock mitigating characteristics of soil plays an important role for construction of above ground explosive storage magazines, underground shelters of strategic importance and design of foot protective systems against the mine blast. The paper presents an experimental method and technique to determine shock mitigation characteristics of a typical alluvial soil in which intense shock generated by contact explosion of high explosive attenuates rapidly as it passes through it. The alluvial soil is a heterogeneous mixture of course sand, fine sand, silt, clay, and water. The experimental soil consists of 8.77 % course sand, 49.42 % fine sand, 22.23 % silt, 19.48 % clay and has a density of 1.5 gm/cc. A series of experiments with tetryl explosive have been conducted on loose alluvial soil and its shock mitigating characteristics have been evaluated from the acquired data. The soil samples of various thicknesses varying from 8 to 12 cm have been used in experiments. These soil samples were subjected to intense shock loads by detonating 35 g of tetryl in contact with the samples. Transmitted shock pressure on the other side of these samples was measured by using kistler make piezoelectric type shock pressure sensor model 6215 with measurement range of 6000bar. The transmitted shock pressure versus time profile for various thickness of soil have been acquired and analyzed for evaluation of shock mitigating characteristics of soil at various thicknesses. A correlation has been developed between peak transmitted pressure and soil thickness.