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## **EFFECT OF SOIL PARAMETERS ON LAND MINE BLAST**

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Protective equipment, either for personnel or vehicles, must be designed to mitigate the effect of a land mine blast. Land mines are found in all types of soil conditions; this research demonstrates that the energy released by a mine varies greatly with the soil conditions surrounding it.

For its ease of use and repeatability, testing of personnel protective equipment (PPE) is often done in dry sand. Repeatability is essential when comparing various types of equipment (e.g., various demining boots); results from dry sand tests are more repeatable than tests done in wet soil, however land mines detonated in dry sand transfer much less energy than land mines detonated in wet soil. It is important to identify what the worst case scenario is, that is, under what conditions a land mine will transfer the most energy to a target. Once this threat is identified, equipment can be designed to protect against it, and testing in dry sand can be related to those worst case soil conditions.

Tests were conducted with a simulated land mine in engineered soil containers where soil conditions could be carefully controlled. A target was attached to a piston apparatus, mounted above the soil container, and the energy transferred to the target was calculated from the height the piston jumped after the land mine was detonated. Variables included: overburden, soil type, moisture, and density. Over 150 trials were performed. The results were compared to larger charge size trials. High density, high moisture, soil conditions can produce four times the energy transfer versus dry sand conditions.