

P49 Soil Behaviour at High Pressures

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Abstract:

An understanding of the behaviour of soils at very high pressures, and over a range of strain rates and ground conditions, is of interest in a variety of engineering applications, particularly in predicting soil response during blast and impact events and in validating numerical models. The facilities and expertise available at the University of Sheffield enable rigorous characterisation of soil behaviour to very high pressures: both dynamically using a split Hopkinson pressure bar, and quasi-statically using the unique mac^{2T} test rig, which is capable of true multi-axial compression.

Split Hopkinson pressure bar experiments have been used to characterise the dynamic one-dimensional compression of soils, where the use of a gauged steel confining ring also allowed the radial response of the soil to be recorded. Soils have also been tested in a nominally unconfined state by using a thin polypropylene tube.

The mac^{2T} test rig has been used to test soils quasi-statically in one-dimensional compression, where the non-cohesive material was placed in a steel test box. The test box permits very high pressures of over 1 GPa to be generated, and allows the initial soil conditions to be carefully controlled. mac^{2T} has also been used to test soils in true multi-axial compression, which permits the location of failure surfaces at very high pressures.

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