

SESSION VII: SUSTAINABLE AGRICULTURAL PRACTICES

USE OF NEW CONE UPLAND PENITROMETER FOR SOIL STRENGTH MEASUREMENTS OF RED YELLOW PODZOLIC SOIL UNDER FOREST COVER

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Soil resistance to penetration or penetrability, which is measured by the penetrometer, has found numerous engineering and agronomic applications. The instrumentation and procedure are fairly simple and rapid, relatively non-destructive determinations are possible both in the field and the laboratory. The force or the work required to drive one of standard metal heads to a given depth has been found empirically to be correlated with soil depth, bulk density and moisture content. The information obtained is interpreted to make diagnoses or predictions regarding soil bearing strength and trafficability, degree of compaction, workability by agricultural implements and the consequences of tillage in terms of soil condition and crop yield.

Different types of penetrometers with spring loaded or proving ring types are in common use. But these instruments are not suitable for local soil conditions due to inappropriate spring mechanism. It also requires high cost for calibration process.

A hammer type low cost appropriate mechanical 'PLAG Upland penetrometer' was designed and constructed. (Patent no: 13360). It consists of a carriage probe unit, one force applied unit and adjustable mainframe. It was used for soil strength measurements of Red yellow Podzolic soil under forest cover in six different layers with ten replications.

The results show that the average soil strength values of the 2.5cm, 7.5 cm, 12.5cm, 17.5cm, 22.5cm and 27.5cm depth layers were 0.7M pa, 1.2M pa, 1.3M pa, 1.3M pa, 1.7 M pa and 1.6M pa respectively. The overall average soil strength of Red yellow Podzolic soil under forest cover was 1.3M pa and the cost of production of the design 'PLAG Upland penetrometer' was 10,000 rupees.