

Soil Penetration Resistance, Bulk Density and Water Content Relationships for six Brazilian Soils Using a Combined Penetrometer-Moisture Probe. (S01-vaz103353-Oral)

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Abstract:

Soil strength affects root growth and water flow, and controls nutrient and contaminant transport in soil. Among the soil parameters affecting soil strength of a specific soil, the soil water content (WC) and bulk density (BD) are the most significant. The objective of this work was to determine the influence of the WC and BD on the penetration resistance (PR) measured with a penetrometer, for six Brazilian soils of different granulometry, from sandy to clayed soils. A combined dynamic penetrometer/coiled TDR moisture probe was used to assess the PR and WC in the soil profile (0-60 cm deep) and BD was measured in samples collected at each 5cm. Data were collected for PR, WC and BD from the raining to the dry season, ranging from very low to high PR and WC. Results showed an exponential dependence of the PR with WC and a power dependence with the BD and the fitted parameters were well correlated with the soil clay and sand

contents. Higher values of PR were achieved at different values of WC for each soil, depending on their granulometry. The most clayed soil reached 10 MPa of PR when it dries down to 0.30 cm³/cm³ while the most sandy soil reached 10 MPa for WC below 0.10 cm³/cm³.

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