

Comparing Shrink/Swell and Conditioned Core Shrink tests

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Soil Instability Index (/ps)

Instability indices are the ratio of Strain to Suction. Ideally both values should be measured.

To do so one needs a well practiced method and a Psychrometer.

Graphs are produced from which Moisture, Strain and Suction are read.

Using the graphs and surface suction range the /ps can be calculated for any condition.

/ps are not the same at different suction ranges. This is because the strain V suction is not linear.

Adequate testing of moisture and suction in similar soils can allow one value to estimate the other very well.

Comparisons of the Shrink/Swell, Conditioned Core Shrink & Soil-Water Characteristic Curve tests.

Shrink/swell test (S/S)		Conditioned Core Shrinkage (CCS) & (SWCC) tests
1	Sampled with 50 mm \varnothing tubes and difficult to push in dry soils.	Sampled with 38 mm \varnothing tubes easier and cheaper to push.
2	Gives different results at different soil moistures.	Conditioned to an initial suction of 3.0 -3.3pF by drying or wetting.
3	I_{ps} is calculated over a Δu_s of 1.8pF but only 1.2pF is used.	I_{ps} is calculated (not estimated) over the correct site suction range.
4	The S/S formula assumes a linear Shrink V Suction relationship.	U.S. researchers have shown that this is only true from 3 to 4pF.
5	A linear assumption overestimates I_{ps} in wet or underestimates in dry.	The CCS graph gives the I_{ps} from actual suction/shrink relationships .
6	The S/S is made up of 2 test which are joined (difficult to do).	Shrink is measured over the actual field range of the climate zone.
7	The swell is only measured in 1D and changed to 2D by \div by 2 ?	Shrink is measured only over the necessary range.
8	The swell part of the test is time-consuming so is often cut short.	The CCS test can produce accurate results in 5-7 days at lower cost.
10	The S/S test does not measure suctions and swell only at >field moisture.	Shrink is measured in the graph saving time and giving a greater accuracy.
11	Suction/Strain/moisture graphs are not produced from this test.	Simple readings produce accurate suction/shrink/moisture graphs.
12	-----	Graphs are drawn by Microsoft XL polynomials for lines of best fit.
13	-----	SWCC are drawn from CCS by measuring weights at each suction reading.
14	-----	SWCC graphs are ideal for footing designs in 'P' sites and forensic work.
15	-----	CCS graphs are used to calculate I_{ps} and y_s without approximations.
16	-----	SWCC graphs can predict past and possible future moisture changes.