LEP
Soil Limitation Rating for Shrink-swell Behavior

Definition and Scope

Shrink-swell behavior is that quality of the soil that determines its volume change with change in moisture content. The volume-change behavior of soils is influenced by the amount of moisture change, and amount and kind of clay in the soil.

Four degrees of limitation are recognized: low, moderate, high and very high.

Assumptions

Classification for shrink-swell behavior is based on the control section of the soil.

Interpretations are for lightweight structures three stories or less in height.

Criteria

Soil Property or Quality	Degrees of Limitation			
	Low	Moderate[2]	High[2]	Very High
Percent clay and predominant clay mineral	0-18%: any clay mineral or 0-35%: kaolinitic clay	18-35%: mixed or smectitic clays or >35% kaolinitic clay	>35% mixed or smectitic clays	> 60% mixed or smetitic clays
Linear Extensibility Percent (LEP)[3]	Less than 3.0	3.0 – 5.9	5.9 – 9.0	>9.0
Shrinkage Index[1]	Less than 5.0	5.0 – 7.0	>7.0	

[1]The shrinkage Index is the numerical difference between the Plastic Limit and the Shrinkage Limit. Special tests, as required by local ordinance, may be used in place of the Shrinkage Index.

[2]Reduce one class for rock fragments greater than 35 percent.

[3]$\text{COLE} = \frac{\text{LEP}}{100}$

References

(1) Portland Cement Association. 1962. P.C.A. Primer.

(2) United States Corps of Engineers. 1963. Unified Soil Classification System. Tech. Memo 3-357, vol. 1. Waterways Exp. Sta.

(3) Brasher, B.R., Franzmeier, D.P., Valassis, V.T., and Davidson, S.E. 1966. Use of saran resin to coat natural soil clods for bulk density and water retention measurements. Soil Sci. vol. 101:108.